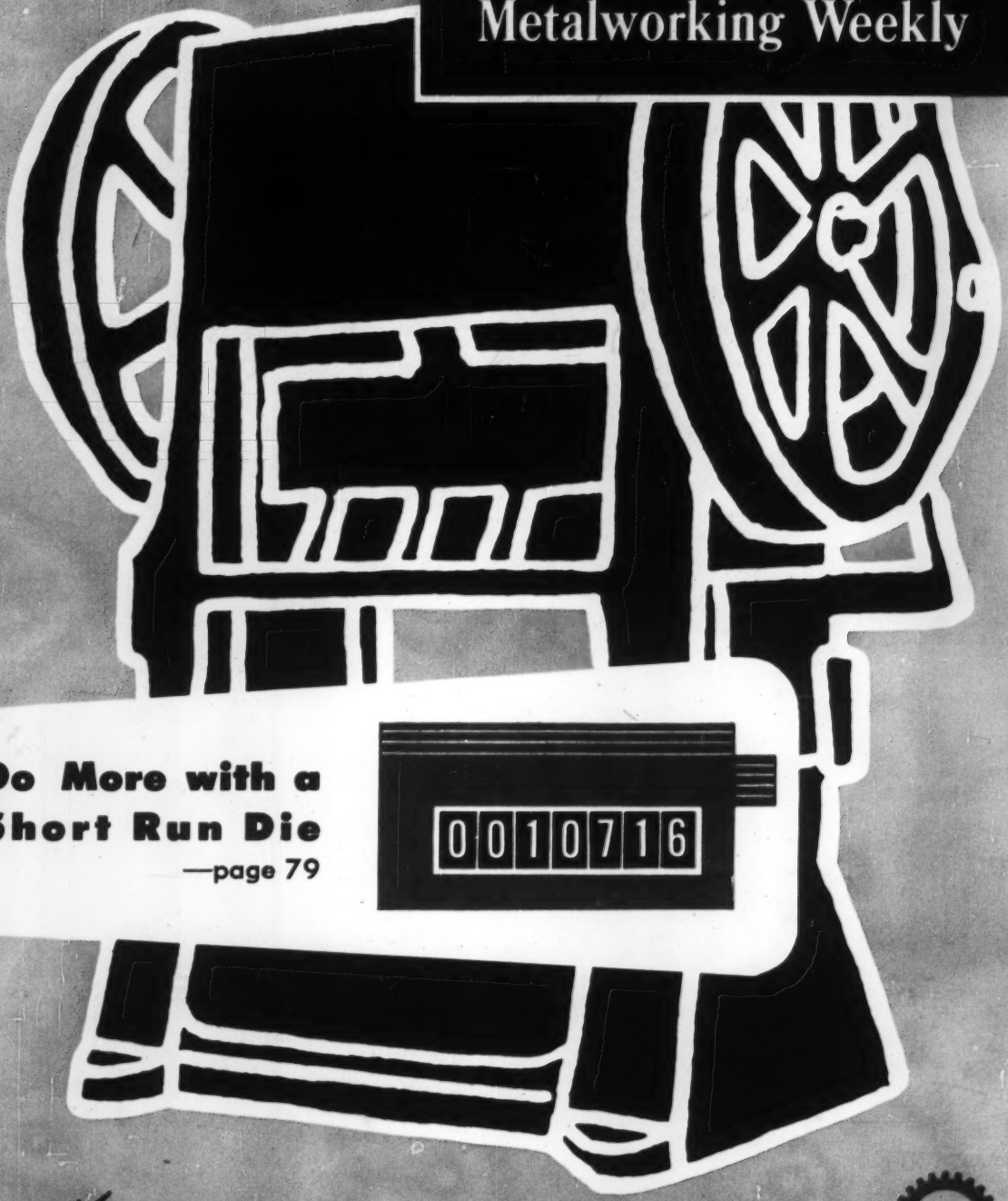
SEPTEMBER 3, 1956

STEEL

The Metalworking Weekly



Do More with a Short Run Die

—page 79

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✔ Tight Future for H.R. Sheets...page 123

production ideas

NO. 4 OF A SERIES

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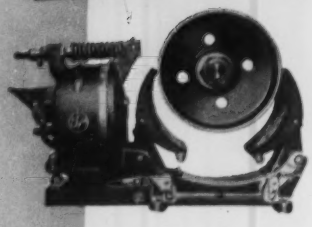
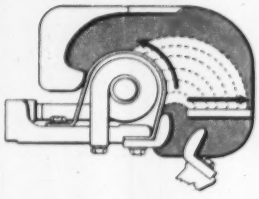
It's EC&M for a Complete Line of ELECTRIC CRANE CONTROL

BRAKES · DISCONNECT SWITCHES · CONTROLLERS · LIMIT STOPS

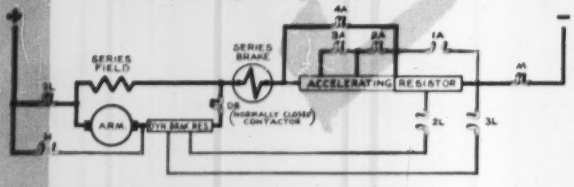


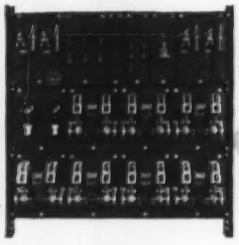
LONG-LIFE BRAKES for cranes operated by A.C. or D.C. power. High speed performance. Low upkeep.



CONTACTORS operate on the LINE-ARC principle. No destructive burning of arc shields. Cool contacts and reduced maintenance.

DYNAMIC LOWERING CIRCUITS for hoist motions. Respond quickly. Permit accurate inching for spotting loads.





REVERSING-PLUGGING CONTROL for bridge and trolley motions. Automatically controlled acceleration. Only one adjustable relay for plugging.

YOUNGSTOWN SAFETY LIMIT STOPS protect against overhoisting accidents. Positive check against human errors.

CAM-TYPE MASTER SWITCHES have narrow width and short throw. Less operator fatigue.

TAB-WELD PLATE RESISTORS —spot-welding provides a continuous path, and keeps resistance value constant.

MANUAL-MAGNETIC DISCONNECT SWITCHES are very easy to operate. They are arranged to control crane lights, too.

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Tool Steel Topics

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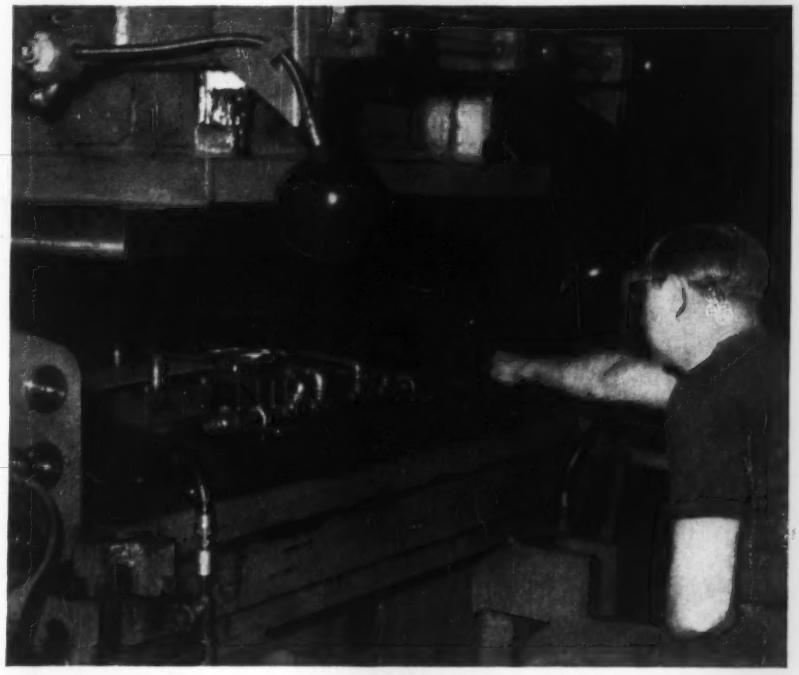


FILM "TEAMWORK" WINS AWARD AT COLUMBUS FESTIVAL

"Teamwork," our new 30-minute color film on tool steel, received an award for excellence in the Business and Industry category at the recent Fourth Annual Columbus Film Festival.

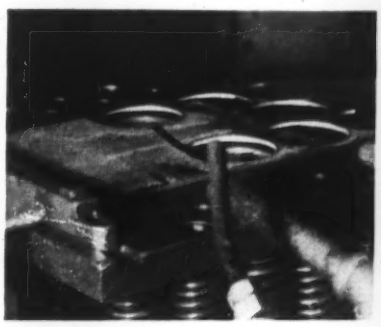
"Teamwork" takes you behind the scenes in describing typical applications of our carbon, oil- and air-hardening, shock-resisting, hot-work and high-speed tool steels. It is now available for showings to die-makers, heat-treaters, machinists, machine-tool manufacturers and distributors. It's also an excellent film for technical society meetings, and for student groups.

It's easy to arrange to see "Teamwork." All you need do is drop a line to the nearest Bethlehem office, or to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. If possible, please select a showing date well in advance, to allow time for scheduling and shipping.

Maker of Washers Rings the Bell with Die Made of Lehigh H

A manufacturer of steel washers found that by using a piercing die made of Lehigh H tool steel, he could get longer, more economical production runs than with dies of another grade, formerly used.

The Lehigh H die produces thousands of round washers daily, in sizes from ⅝ in. to 1 in. It is hardened to approximately Rockwell C 61, and pierces 5/32-in. C 1035 steel sheet. Because of the severity of the piercing operation, redressing of the die is required after every third turn, but only 0.020 in. is removed. Close to 100,000 washers are turned out between grinds.



Lehigh H handles this blanking job to perfection because of its outstanding wear-resistance and toughness. Lehigh H is a superb high-carbon, high-chromium grade of air-hardening tool steel. It can always be counted upon for a good job because of its resistance to wear, minimum distortion in heat-treatment, and high compressive strength.

TYPICAL ANALYSIS

Carbon 1.55	Molybdenum 0.80
Chromium 11.50	Vanadium 0.40

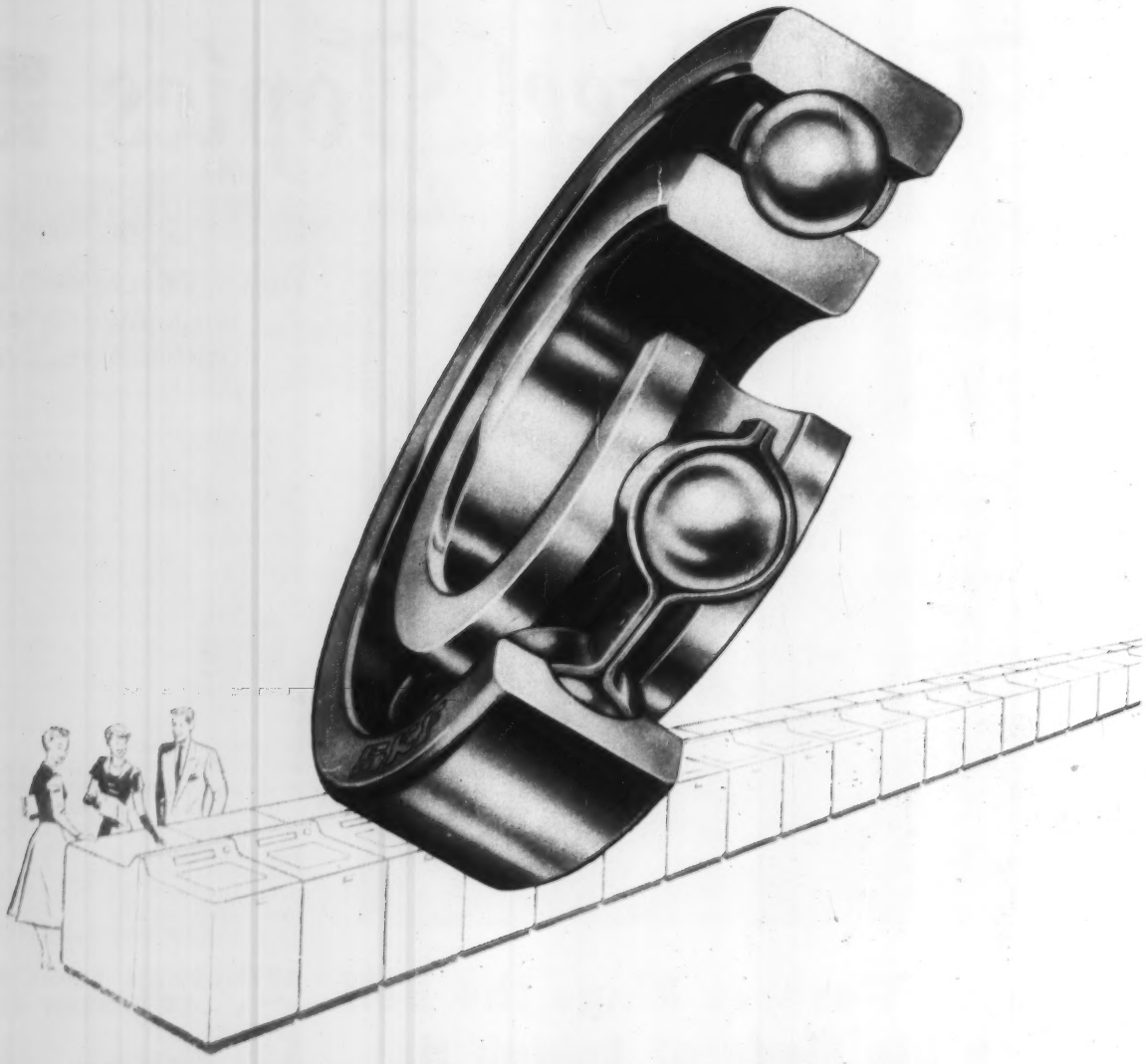
If there are applications in your shop which require a combination of wear- and shock-resistance, plus high compressive strength, look into the advantages of Lehigh H. Your local Bethlehem tool steel distributor, as friendly a man as you'll find anywhere, is at your service.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Punched Holes Often Close-in

In precision punching it is common practice to make the punch diameter exactly the same as that of the desired hole. (All the clearance required is then applied to the I.D. of the die.) For many operations involving holes greater than 1 in. diameter, for example, and stock less than ⅛ in. thick, this procedure is correct. But in other operations it is incorrect, because the elasticity of the stock causes the holes to close-in after punching, so that the holes are actually smaller than the punch which made them.

With large-diameter holes and thin stock, the elastic springback which tends to close-in a punched hole causes the stock to buckle instead, so that the hole diameter will be accurate under these conditions. On holes 1 in. in diameter and smaller, expect a close-in of 0.002 to 0.003 in. with stock ⅛ in. to ¼ in. thick, and a closing of 0.001 in. on stock 0.030 in. thick (22 gage). Closing will be negligible on stock 0.010 in. thick (32 gage) or less. For precision punching, therefore, add the expected close-in to the punch size to produce the correct hole diameter.



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Whatever your product, it will pay you, too, to switch to SKF anti-friction bearings and get the *plus values* which are built into every one. 7750

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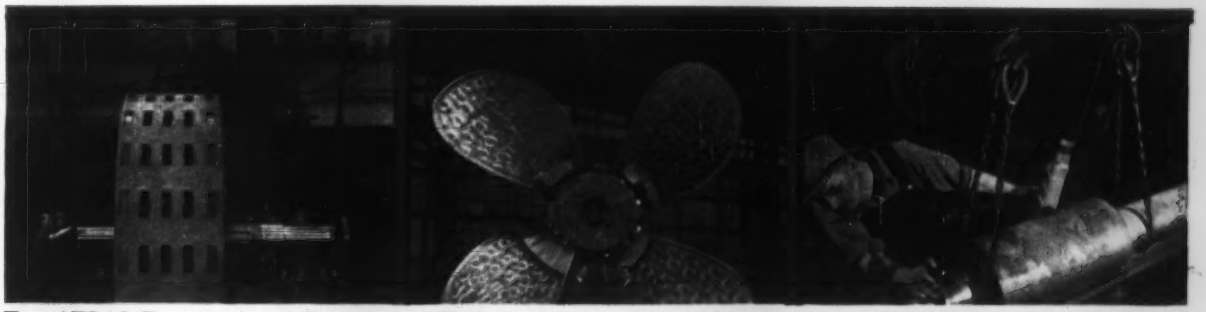


Two ATLAS Type 1, 8-part Round-Braided Slings handling generator unit.

ATLAS Type 1, 8-part Round-Braided Sling used in Figure 8 hitch for handling ship propeller 22 ft. in diameter and weighing 71,500 lbs.

Two ATLAS Type 5 Whip Slings used with an assembly E Sling centering roll in lathe.

Material handling made safe, fast, and easy with BALANCED SLINGS!

ATLAS E-2 with Anchor hooks and Type 5 Whip Slings.

The balanced braided construction of ATLAS Slings results from Macwhyte's exclusive method of braiding endless right and left lay ropes. This method of braiding provides a balanced sling for safe, easy handling of a wide variety of equipment.

Because ATLAS slings are so lightweight and flexible, they are easy to use and save handling time.

Feel free to ask us for recommendations.

We will also make slings to your specifications.

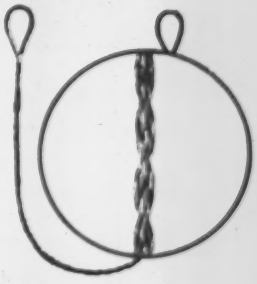
Here's ATLAS balanced braided sling construction

1 One right lay and one left lay wire rope are each spliced endless.

2 These ropes are hand-braided to form a round sling body.

3 All ropes in the body react in the same manner when loaded and each rope carries an equal share of the load.

4 These features produce a lightweight, flexible, kink-resisting sling that hugs the load for safe and economical handling.



For prices, literature, or catalog, call your Macwhyte distributor, or write direct to Macwhyte Company.

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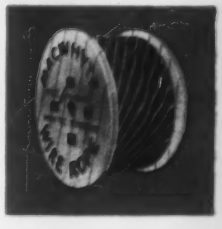

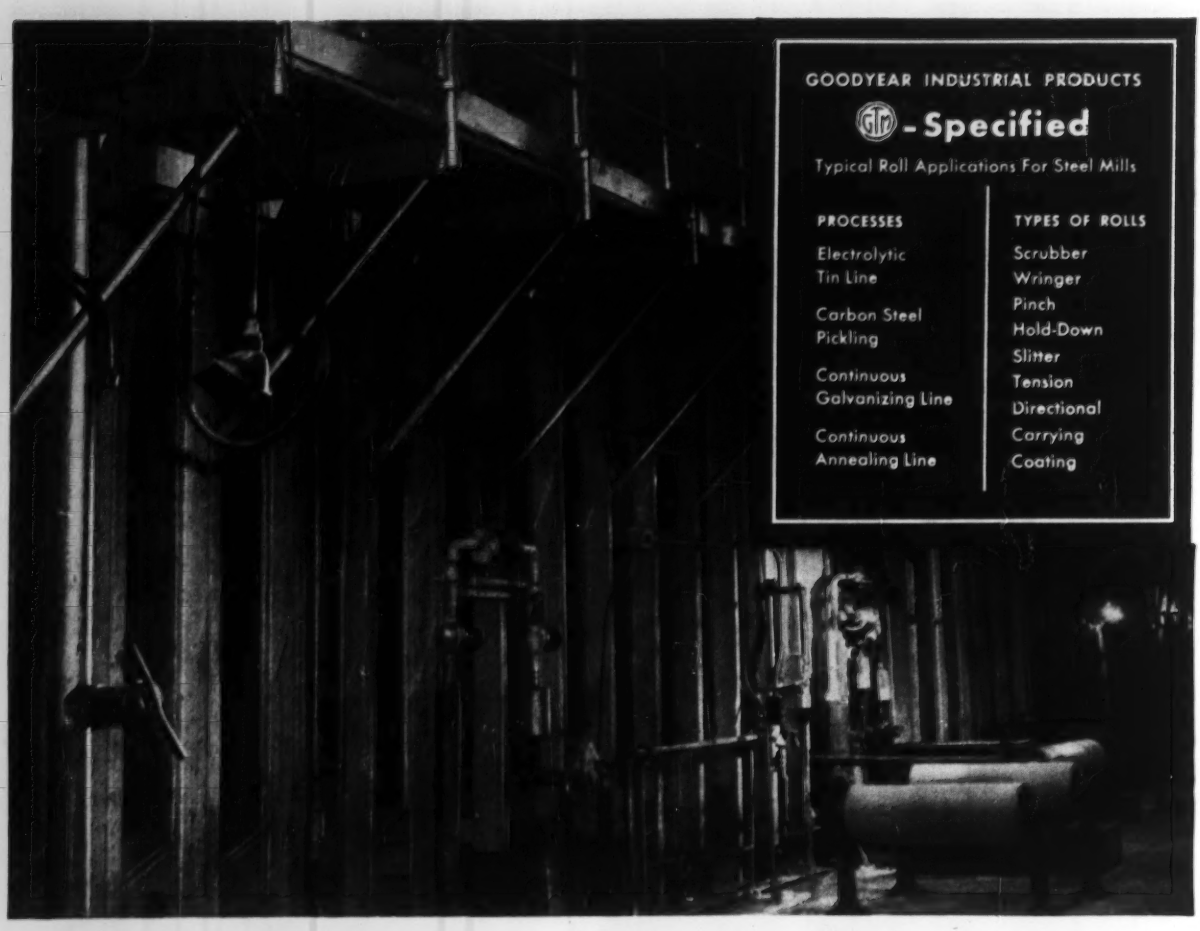

G.T.M. More than doubles life of tin line rolls

ABOUT 18 MONTHS was considered excellent service for the rubber covered rolls in the plating compartments of this tin line. Abrasion and cutting plus constant immersion in approximately 200° F. sodium stannate solution were the life-limiting factors.

Then rolls specified by the G.T.M.—Goodyear Technical Man—were put to the test. They served an average of 3 years and 7 months—were worn down only 1/16" in turning out 4,000,000 base boxes or 71,000 miles of tin plate. And with regrinding they'll be ready for many miles more!

The G.T.M. may well have a similar answer to your rubber covered roll or other industrial rubber problems. Why not find out by contacting him through your Goodyear Distributor? Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

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THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

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The Metalworking Weekly

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Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscriptions in the U. S. and possessions, Canada, Mexico, Cuba, Central and South America, $10 a year, other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1956, The Penton Publishing Co.

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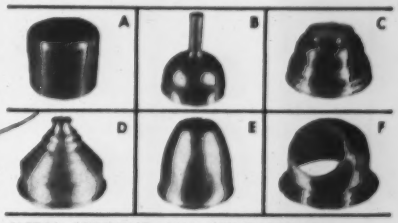
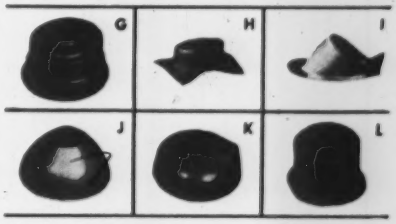


METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Handle lamp; C—Lamp shade; D—Lamp base; E—Electronic cover; F—Compass cover.



HYDROFORMING:
Typical items: G—Appliance cover; H—Jet engine detail; I—Aircraft detail; J—Jet engine detail; K—Cleaner cover; L—Motor housing.

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behind the scenes

They Told Alex

When Alexander the Great was floating down the Indus river on his way to the Indian ocean, he took a small herd of gymnosophists with him to help while away the time. Gymnosophists were naked philosophers, noted mostly for their ability to give quick and ready answers to tricky questions. They were noted, too, for the fact that they wore absolutely nothing; claimed they could think better in the raw.

Alexander amused himself by cooking up sneaky questions and throwing curves at the nature boys, but they hit safely every time, proving that clothes may make the man, but never the philosopher.

"Which produces the larger beasts," inquired the conqueror, "the earth or the sea?"

"The earth," came the answer; "the sea is but part of it."

Alexander gnawed his nails. "Which are the more numerous, the living or the dead?"

"The living, because the dead are not at all."

The Macedonian tried again. "Which is the cunningest of beasts?"

The gymnosophists chuckled merrily, as if someone had said: "Ain't nobody here but us chickens," and shouted in unison: "The one that ain't been caught yet!"

Crystal Balling

From the foregoing, it will be accepted that answering trick questions is quite an art, and that it has been practiced a long, long time. You will see that STEEL is going in for it, too, beginning on page 45, with a report on a four-month outlook for metalworking. This article attempts to answer a lot of tricky questions on economic prospects, particularly for autos. While we don't have a genuine gymnosophist in the house, STEEL's editorial staff has given the subject a great deal of attention. Nobody has suggested that they shed to the buff to facilitate their thinking—even though the weather, sometimes, makes it sound like a good idea, but it doesn't make any difference: You'll find that report so apt and professional you'll have difficulty believing any of the writers had worn a stitch of clothing.

This four-month outlook for metalworking, especially for automobiles, is weighted by the measured opinion of selected management, manufacturers, capitalists and economists, and if you are interested in steering a business course through December, clip this article and paste it in your binnacle.

More Copies, Please

We don't know whether the personal charm of Beverly Cline, editorial service, transcends the attractiveness of STEEL's editorial content, or whether readers simply crave a variety of material: In any event, Beverly sends out hundreds of tear sheets from every issue to folks who call, write, or wire from every corner of what salesmen love to call "the territory."

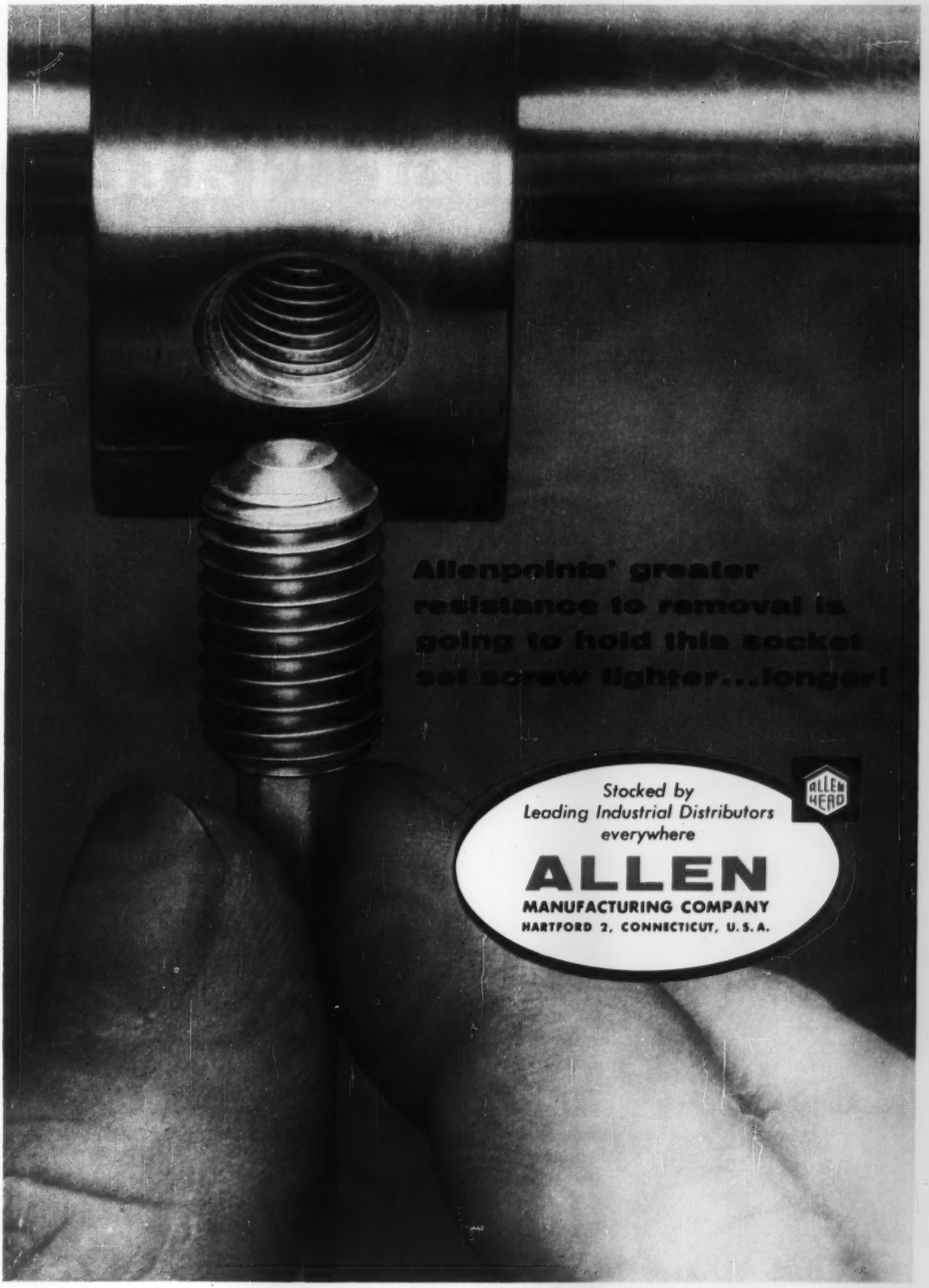
"Sometimes," says Beverly, "we'll run an article that turns out to be a sleeper; first thing we know requests are pouring in from Peoria to Pakistan for reprints. Some, of course, are naturals like 'Tubing Sells Itself to Machinists,' which was No. 1 in a series called Production Ideas. It ran on June 4, and we started getting requests for it on the same afternoon. We've been talking only about tear sheets. You ought to let June Schilens in Reprint Service tell about the big orders for articles."

Buzzing from Beverly to June, like a rickety bumblebee from flower to flower, we approached June and inquired about the reprint business. She was frank: "All we need are four-armed printers, triple-speed presses and a new conception of time," she declared. "Customers don't like to wait, and our printers aren't clever enough to do a day's work in 1 hour. Our biggest order this year? I think it was 50,000 copies of '151 Uses for Silicones in Metalworking,' reprinted for Dow Corning Corp., Midland, Mich. Excuse me, I have to make a long distance telephone call."

Somebody in Dubuque, Iowa, wanted an estimate on 500 copies of the brazing series.

Shrdlu

(Metalworking Outlook—Page 39)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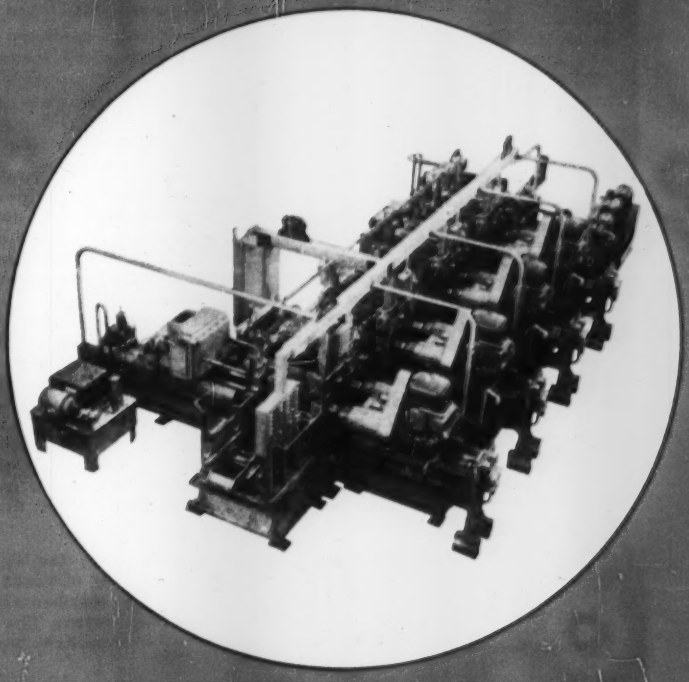

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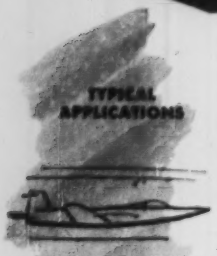
TYPICAL APPLICATIONS



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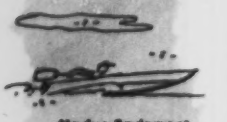

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In your Aug. 20 issue, I read the article, "Want To Be a Mill Customer?" (page 76). I found it interesting and would appreciate a copy.

James J. O'Sullivan
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Indianapolis

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Sharon, Pa.

Query on 'Dry Coat'

We have read with interest the article, "Lubrication in Drawing" Part III (July 23, page 94). We would like additional information about the "dry coat" lubricant and would appreciate the mailing address of the Kondor Products Corp.

G. B. Parkison
Purchasing Agent
Vulcan Pipe & Engineering Co.
Los Angeles

• *It is at 18120 Sloane Ave., Cleveland, O.*

More Sales from Agents

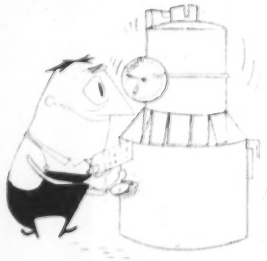
We would appreciate receiving two copies of the article, "19,000 Sellers for Hire" (July 30, page 59). This article is of considerable interest to us.

John L. Hallman
Manager-Marketing Division
Alan Wood Steel Co.
Conshohocken, Pa.

Please send a reprint.

Louis A. Welt
President
Steel City Testing Machines Inc.
Detroit

Brazing Interests Engineer



Your article, "Brazing in a Vacuum" (June 4, page 107), is full of interest to us. We would appreciate a copy.

V. H. Pavlecka
Project Engineer
Special Projects
American Machine & Foundry Co.
Brooklyn, N. Y.

Files Heat Treating Series

Although we extract the articles in the Modern Heat Treating series from STEEL, we have missed several of them. I am building up a technical data file to be used by the engineering department and would appreciate your sending us a complete set for our file.

If another set is available, one of the

(Please turn to page 12)

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IF you're involved in aluminum procurement or fabrication . . . you should have this new illustrated brochure prepared by Frasse.

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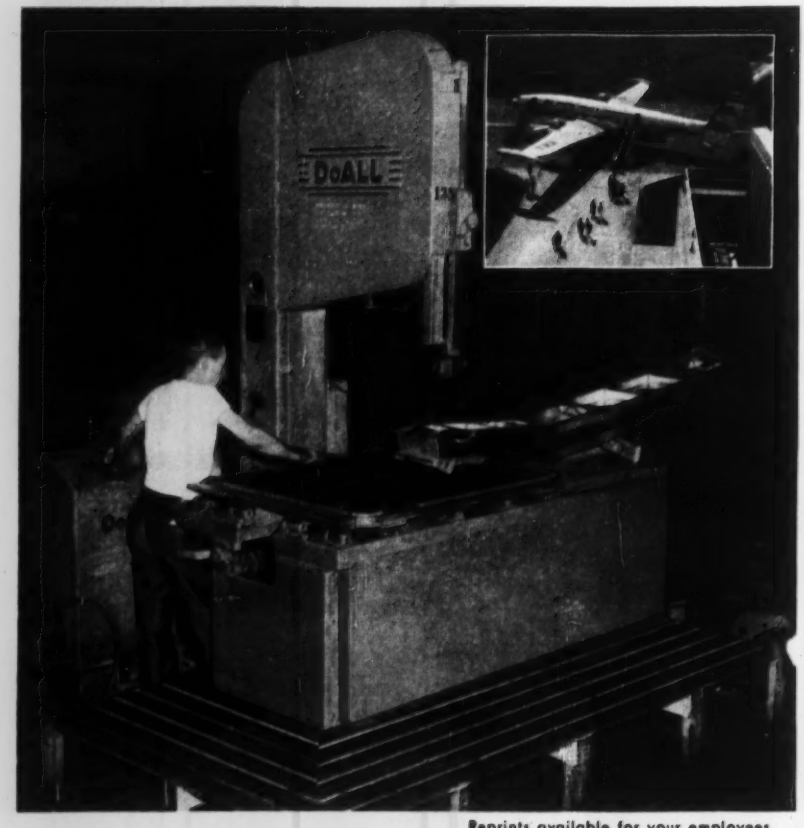
The retarding influences today are many and varied. Excessive taxes hold back the flow of risk capital into new equipment. Punitive laws do not permit industry to charge off depletion as fast as tools are becoming obsolete. Double taxation discourages new enterprise because the profit incentive is stifled.

The illustration below explains how our tool economy works and the reason more and better tools are needed. The band machine illustrated is slicing out a section of a structural part for an airplane. This $8000 machine does the job in about 8 minutes. On an $80,000 planer the job would take about an hour. The band machine is a development of the DoALL Company. It is typical of the newer, better tools that industry will have to buy and use to meet tomorrow's demands for goods. With such tools to enormously increase human productivity, we will meet our growing demands and have a shorter work week besides.

The key is the elimination of the senseless red lights now placed along the freeway of American production.

87% TIME SAVING results from band machining this aircraft part . . .



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Reprints available for your employees.

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Des Plaines, Illinois

38 Local Sales-Service Stores E-16

LETTERS

(Concluded from page 10)

engineers here would like to have it for his files.

R. B. Ackley
Chief Staff Engineer
Product Engineering Department
Porter-Cable Machine Co.
Syracuse, N. Y.

Reader Wants Supplier

The article, "More Strip from a Sendzimir" (July 16, page 142), mentions a dual purpose coolant called "Rycosol." We would appreciate your furnishing us the name of the supplier of this product.

C. B. Munton
Head, Finishes Research Department
National Cash Register Co.
Dayton, O.

• *The supplier is Reilly-Whiteman-Walton Co., Conshohocken, Pa.*

Ideas on Production

We are interested in seeing that our salesmen receive copies of your interesting Production Ideas series. May we have permission to photostat the articles, "Tubing Sells Itself to Machinists" (June 4, page 103) and "Holes Forged In" (July 2, page 67)? We want 50 copies to cover our sales force. Necessary credits to STEEL would be noted.

C. T. Lanigan
Sales Promotion
Forging-Tubing Sales
Rome Mfg. Co. Division
Revere Copper & Brass Inc.
Rome, N. Y.

• *Permission granted.*

Closer Than You Think

After reading your fine article, "Atomic Planes Are Closer Than You Think" (Aug. 20, page 116), I noticed extra copies are available. I would like to request two copies.

D. O. Gerde
Tool Development Engineer, Plant I
Convair
Division of General Dynamics Corp.
San Diego, Calif.

Will you send us a copy of the article?

Secor Browne
W. H. Nichols Co.
Waltham, Mass.

Series Assists Engineer

We have enjoyed immensely your three-part article on silver brazing: "Brazing with Silver Alloys" (June 25, page 80); "The Why of Flux" (July 2, page 80); and "Fluxing Techniques" (July 9, page 99).

We find them quite informative and of considerable assistance and would like to request extra copies.

Carl R. Loper Sr.
Application Engineer
Rectifier Section
Electrical Application Dept.
Allis-Chalmers Mfg. Co.
Milwaukee

I was impressed with the June 25 article on silver brazing and notice that it is one of a series. Would it be possible for me to obtain reprints? They would be of great value to me as reference material.

Walter R. Saupe
Department 91
Manufacturing Process
Frigidaire Division
General Motors Corp.
Dayton, O.

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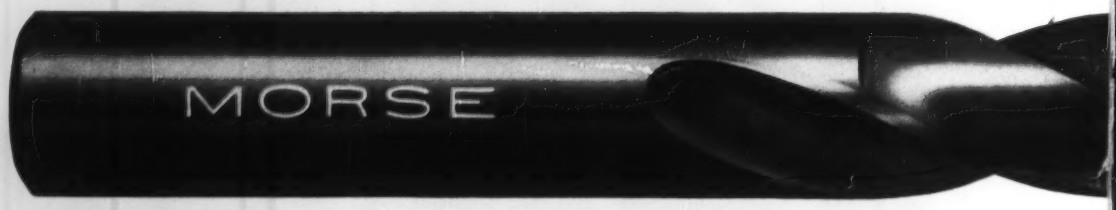

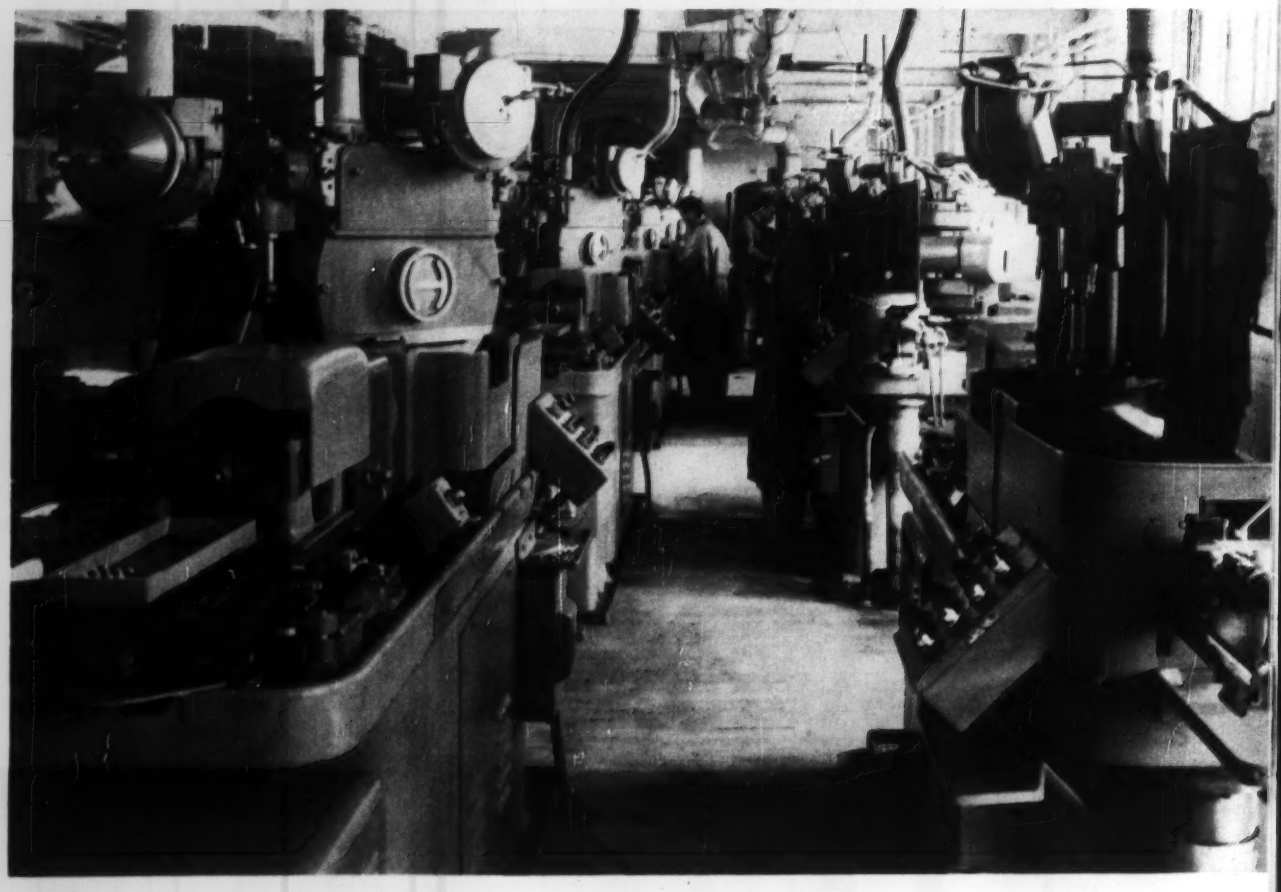

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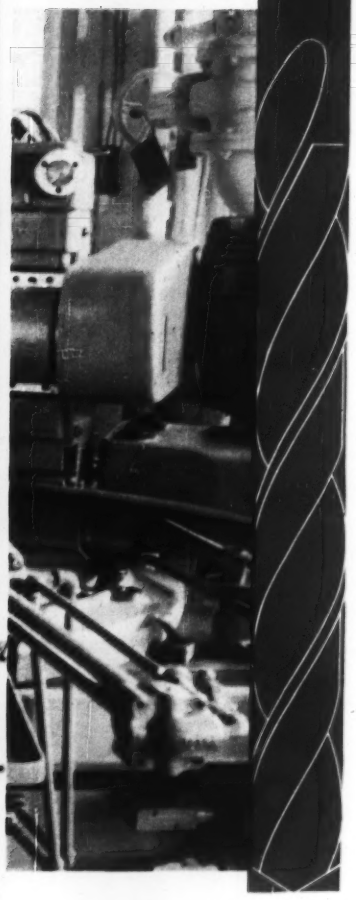

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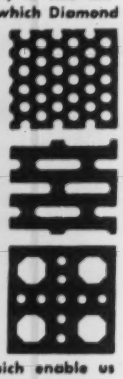

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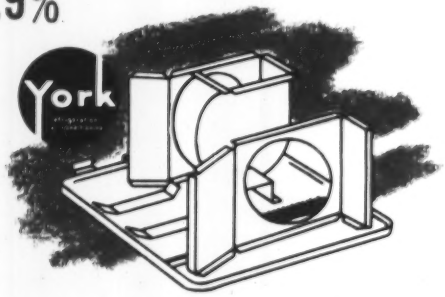

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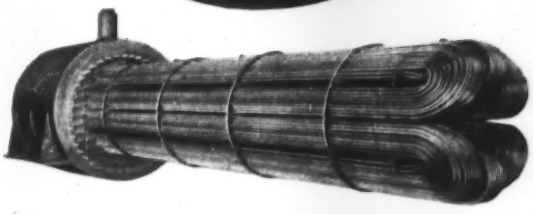

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Turbolectric propellers use extruded hollow steel blades produced by the controlled extrusion process developed by Curtiss-Wright. The extruded blade begins as a single-piece alloy steel billet.

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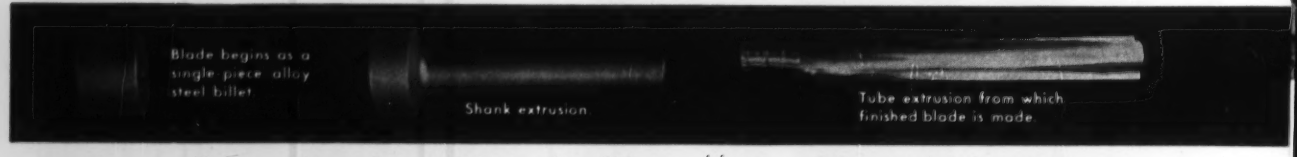
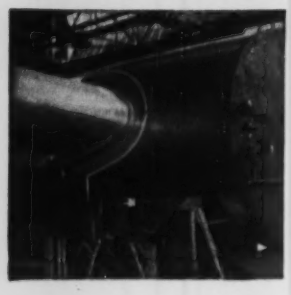


Strength-to-Weight or Heat Problems—Republic Has the Answers



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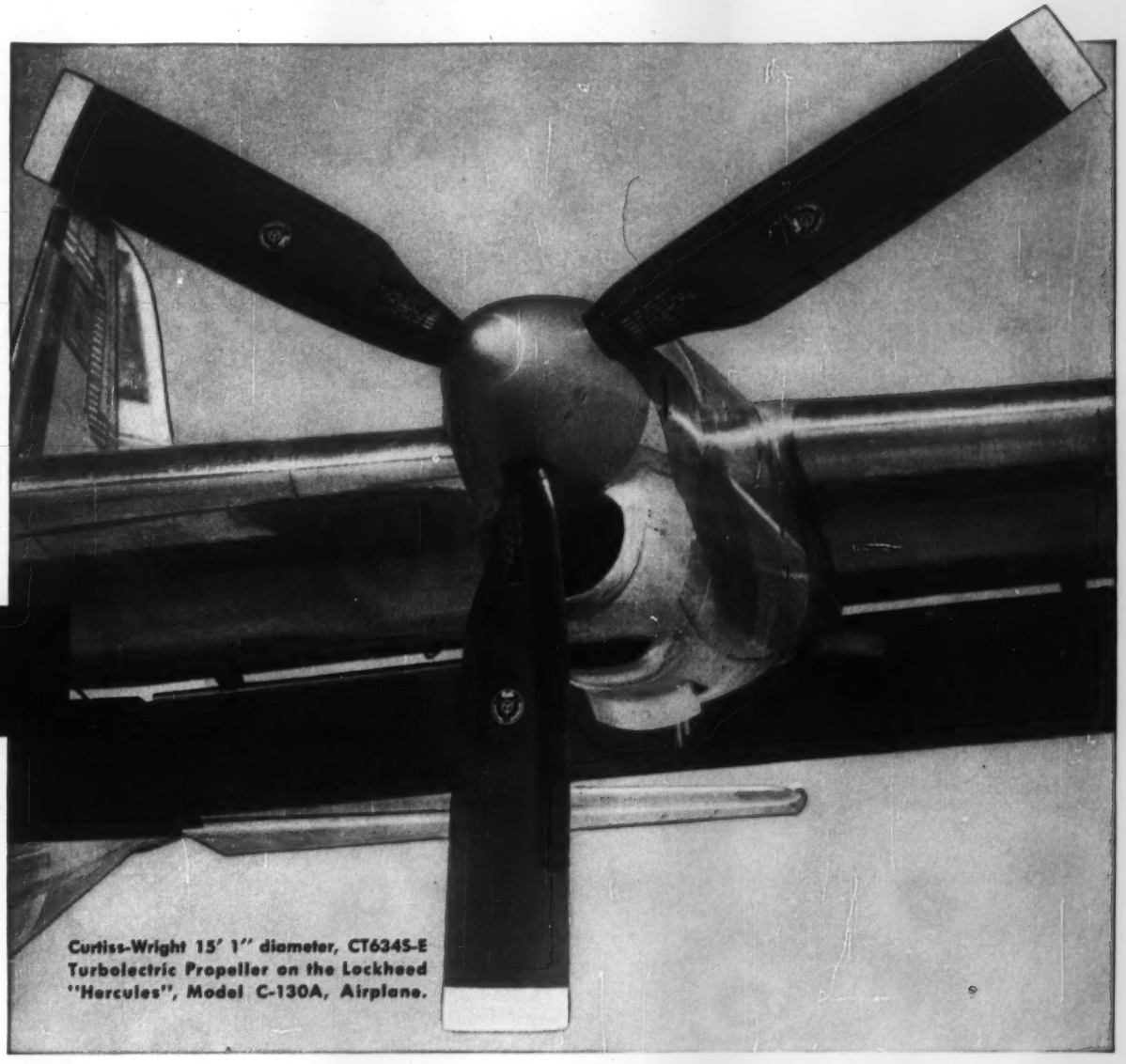

Curtiss-Wright 15' 1" diameter, CT6345-E Turboelectric Propeller on the Lockheed "Hercules", Model C-130A, Airplane.

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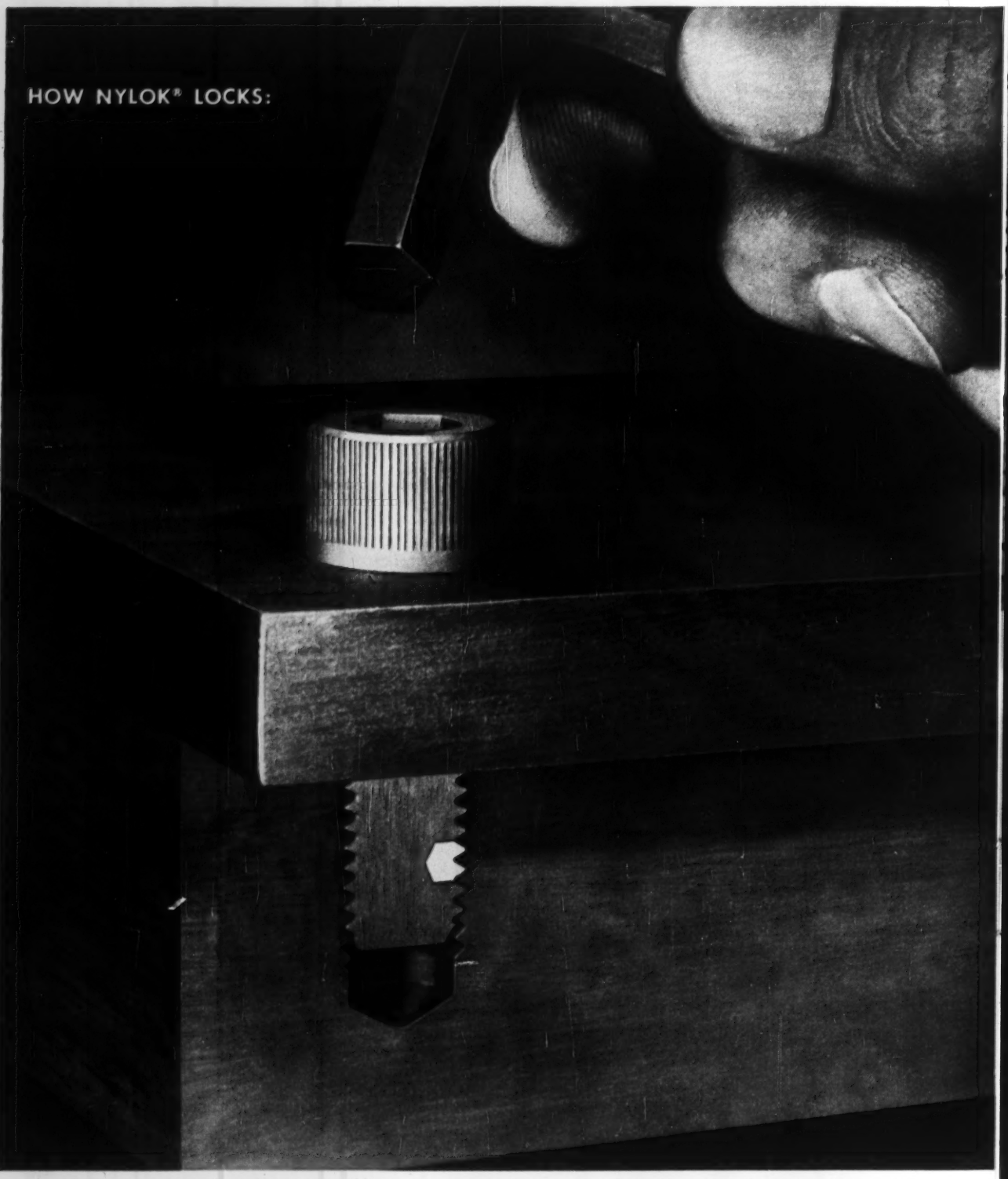
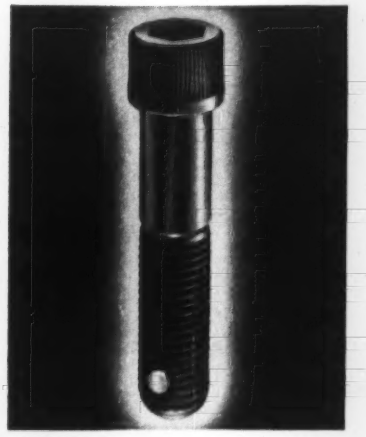
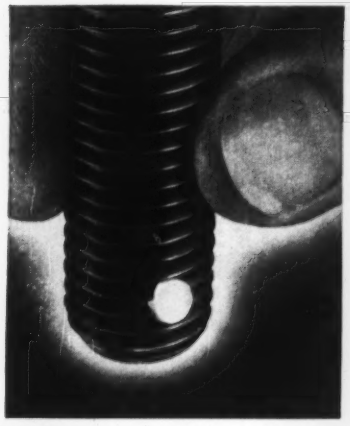


LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

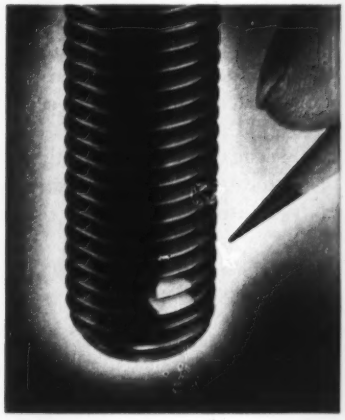
socket head cap screws



Self-locking UNBRAKO socket head cap screw.



BEFORE ASSEMBLY. The nylon pellet projects slightly. When assembled, threads will be impressed into it.



AFTER REMOVAL. "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

They won't work loose. And they simplify design and save production time.

UNBRAKO socket head cap screws are now available embodying the Nylok* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOS are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from —70° to 250°F. And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

**T.M. Reg. U.S. Pat. Off., The Nylok Corporation*

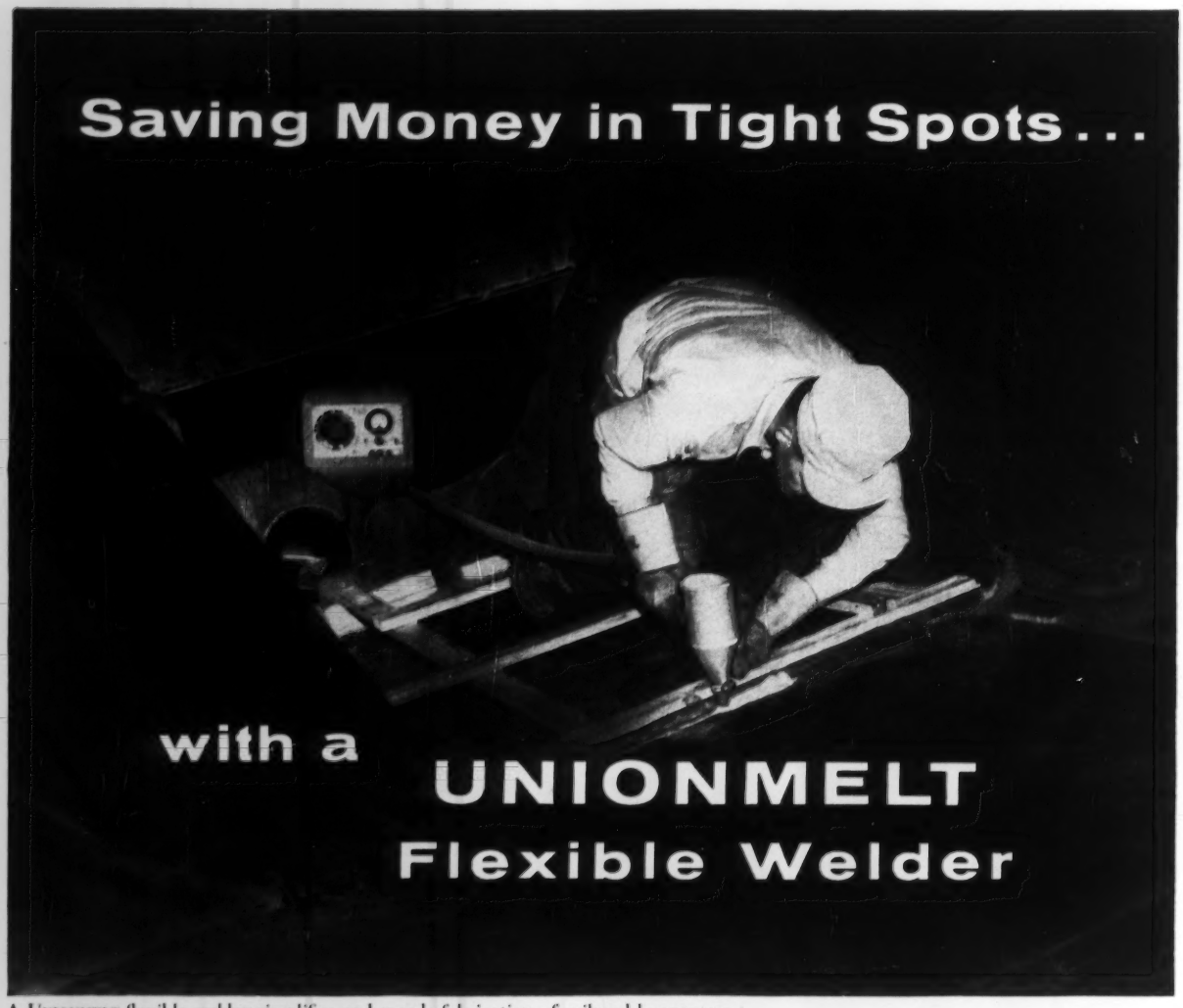
UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

Saving Money in Tight Spots...



with a UNIONMELT Flexible Welder

A UNIONMELT flexible welder simplifies and speeds fabrication of railroad hopper car.

Wherever flexibility and maneuverability are required in welding, the UNIONMELT flexible welder far outperforms rigid, mechanical installations . . . Welding in corners and in tight spots is no problem with this sturdy portable unit, and top quality welds are produced at speeds up to 40 inches per minute in many operations. The combination hopper and welding head is lightweight, and requires no special skill to operate.

Combines Advantages

This UNIONMELT flexible welder combines the speed of mechanized installations with the operational freedom of manual welding. Wire feed unit and controls are mounted on a mobile carriage which can be moved quickly from one job to another, or from point to point on the same job. Initial investment for flexible welding equipment is considerably less than for stationary automatic welding installations—operations are economical, and maintenance costs are low.

For more information on this and other modern methods for joining metals, call your local LINDE representative, or write for free illustrated literature.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

The terms "Linde" and "Unionmelt" are registered trade-marks of Union Carbide.

Linde Trade-Mark

CALENDAR
OF MEETINGS

Sept. 7-9, Metal Powder Association: Fall meeting, Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 9-12, American Institute of Chemical Engineers: Fall meeting, William Penn hotel, Pittsburgh. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 9-12, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Sept. 10-12, Allied Railway Supply Association: Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.

Sept. 10-12, American Society of Mechanical Engineers: Fall meeting, Cosmopolitan hotel, Denver. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Sept. 10-12, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 343 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute: Packaging machinery and material exposition. Public Auditorium, Cleveland. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

Sept. 12-14, Porcelain Enamel Institute: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

Sept. 16-20, American Society of Sanitary Engineering: Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 17-21, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Sept. 17-21, Instrument Society of America: Annual instrument-automation conference and exhibit, Coliseum, New York. Society's address: 1319 Allegheny Ave., Pittsburgh 33, Pa. Executive director: William H. Kushnick.

Sept. 20-21, American Hot Dip Galvanizers Association: Semiannual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Head Unit of Radial Drilling Machine mfg'd. by Cincinnati Bickford, Division of Giddings & Lewis Machine Tool Co.

Tailor-made CASTINGS*

65 in Cincinnati Bickford Head Unit

Producing castings for today's precision machine tools demands the ultimate in technical skill. That's why machine tool manufacturers, such as Cincinnati Bickford, specify castings "tailor-made" by Hamilton Foundry. They know it pays to take advantage of Hamilton Foundry's well-earned reputation for "tailoring" castings to do the jobs they were designed to do!

At Hamilton Foundry, you'll find the most rigid adherence to the design engineer's specifications plus a wide variety of irons that meet physical properties required by service conditions. And you can stop worrying about intricate designs . . . tight dimensional tolerances . . . and wide range of metal sections.

P.S. Above photo shows the Head Unit of Cincinnati Bickford's 7 foot, 19" column, Super Service Radial Drilling Machine, featuring complete hydraulic pre-selection of all 36 speeds and 18 feeds. This Head Unit contains a total of 65 "tailor-made" HAMILTON QUALITY CASTINGS® with a weight range of 0.3 lbs. to 804 lbs.

Call on Hamilton Foundry for "tailor-made" castings.

* HAMILTON H

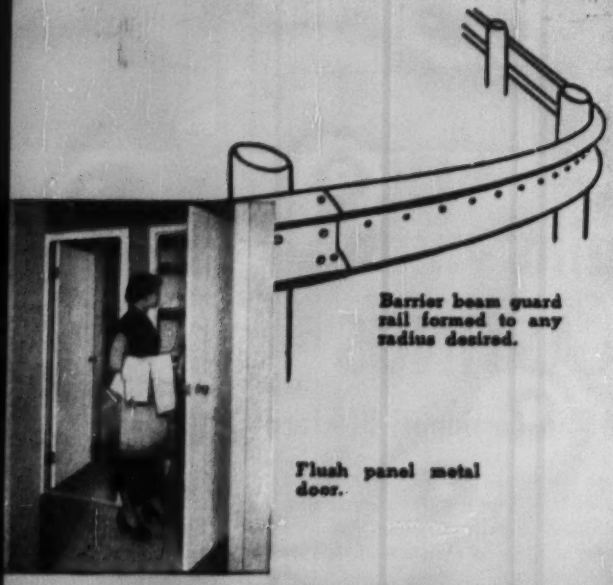
GRAY IRON • ALLOYED IRON
MEEHANITE • NI-RESIST • NI-HARD

THE HAMILTON FOUNDRY
AND MACHINE CO.
1551 Lincoln Avenue • Hamilton, Ohio
Phone TWinbrook 5-7491

H56-4

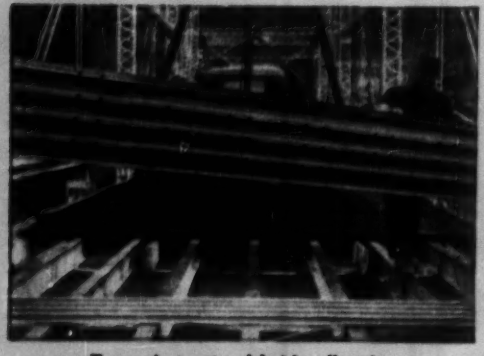
this CINCINNATI

is giving accurate and versatile performance at

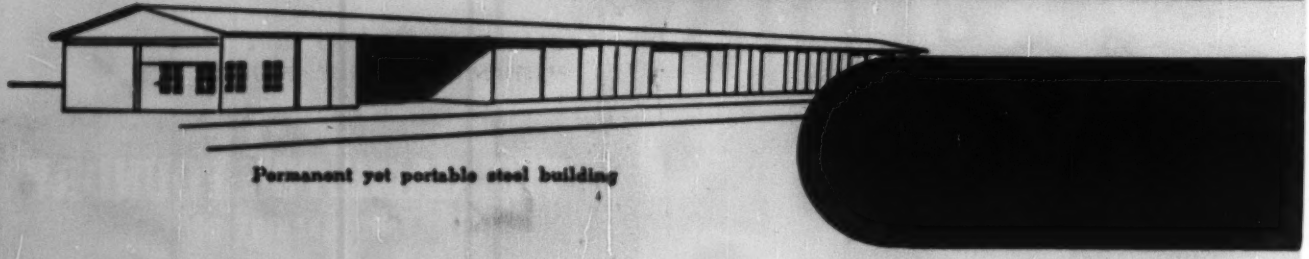


Barrier beam guard rail formed to any radius desired.

Flush panel metal door.



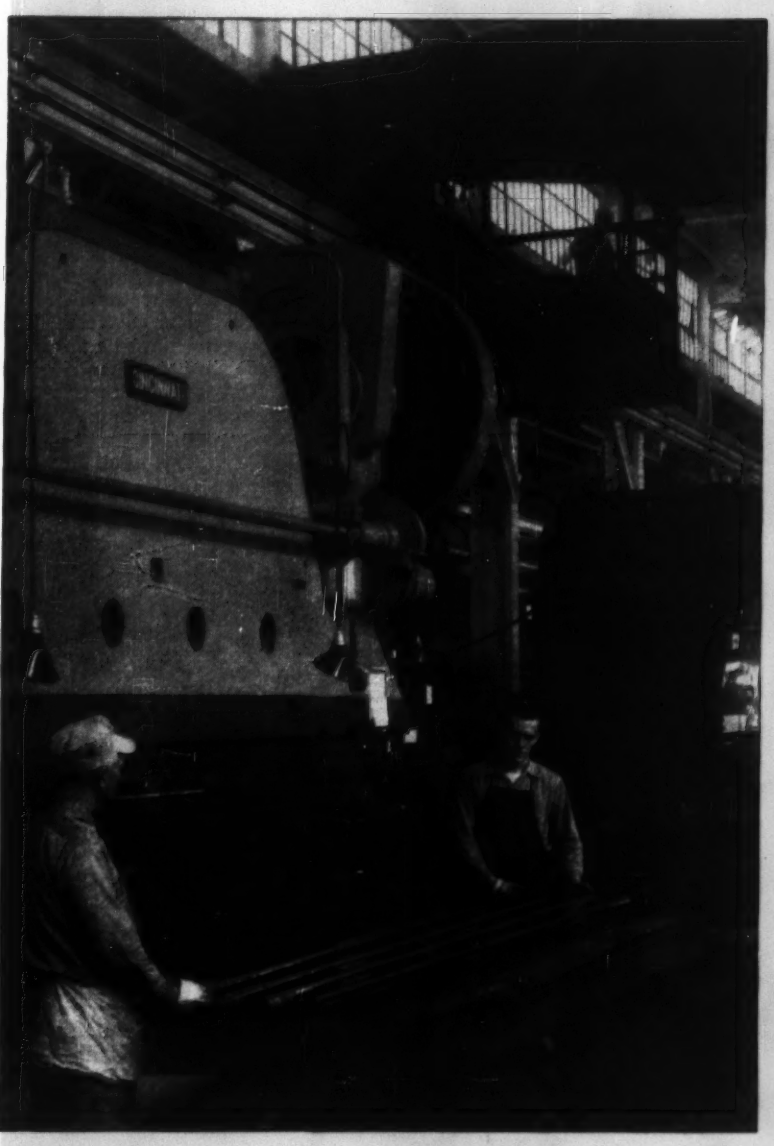
Formed structural bridge flooring



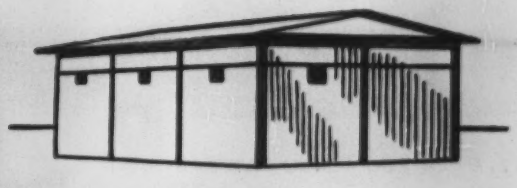
Permanent yet portable steel building

PRESS BRAKE

UNITED STEEL FABRICATORS, Inc.



Photos courtesy of United Steel Fabricators, Inc., Wooster, Ohio



All steel buildings of a thousand uses

WITH ample capacity, this powerful 50 S-series Cincinnati Press Brake with 18′ 6″ clearance between housings and 22′ die area—handles formed structural bridge flooring, guard rails, steel doors. Girders and side walls for various types of metal buildings are also produced. United Steel Fabricators, Inc. are pleased with the accuracy in forming and ease and speed of operation which are important factors in this economical production.

INVESTIGATE:

—Cincinnati Center Line Loading

—Cincinnati Interlocked Construction

—Cincinnati Rigid Deep Beds and Rams

Write for the latest Press Brake Catalog B-4.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

(Advertisement)

NELCO Brown & Sharpe
A Tremendous Tooling Team!

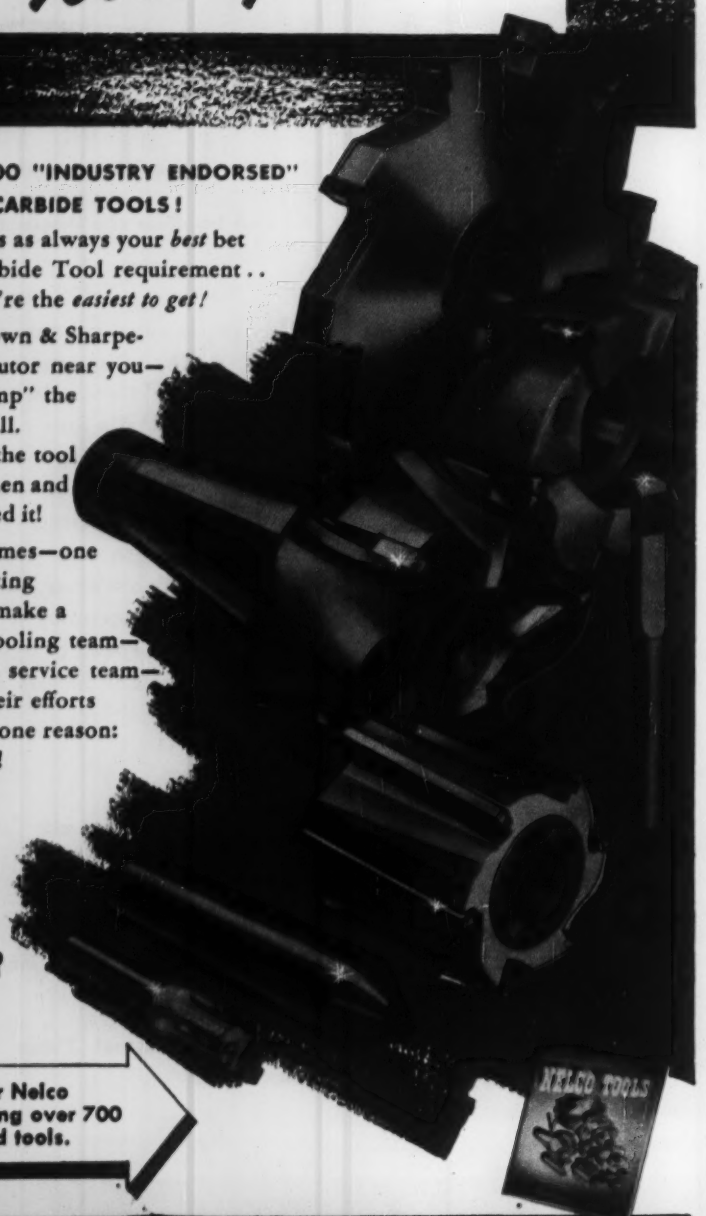
. . . OVER 700 "INDUSTRY ENDORSED" STANDARD CARBIDE TOOLS!

NELCO Tools as always your *best* bet for every Carbide Tool requirement . . and now they're the *easiest to get!*

There's a Brown & Sharpe-Nelco distributor near you—and he'll "jump" the minute you call. He'll deliver the tool you need—when and where you need it!

Two great names—one great distributing organization make a tremendous tooling team—a tremendous service team—combining their efforts and skills for one reason: to help YOU!

CALL YOUR NEAREST DISTRIBUTOR



Send today for Nelco catalog showing over 700 Carbide Tipped tools.

NELCO TOOLS

For that EXTRA Edge in Production!

NELCO TOOL COMPANY, INC. • MANCHESTER, CONNECTICUT

BROWN & SHARPE—NELCO COMBINE SALES ORGANIZATIONS!

A milestone in metalworking will be reached on September 1st, 1956, when Nelco Carbide Tipped Milling Cutters will become available through the Brown & Sharpe Sales Organization. Complete inventories of Brown & Sharpe—Nelco standard cutting tools will be maintained in every metalworking center, and dependable "milk route" delivery of any Nelco cataloged Carbide or Carbide Tipped Tool as well as any of the complete line of Brown & Sharpe High Speed Steel Cutting Tools and Accessories can be expected.

ANSWERS DEMANDS OF AMERICAN INDUSTRY

Recognition of the demanding production schedules of industries has made this complete sales cooperation expedient. Overnight delivery of the finest, proven tools available today is a service industry has a right to expect. New machine tools, expanded production commitments, pressure on delivery schedules, demands for reliable tooling have all pointed up the need for a single, dependable, complete tooling source.

NELCO "SPECIAL" TOOLS AT STANDARD PRICES

Carbide Tipped Face Mills, Slab Mills, Boring Bars, Special[illegible], Slitting Saws, Cutter A[illegible] bide Tipped Side M[illegible] Mills, Cutter A[illegible] Cutters, Di[illegible] Shell End Mi[illegible] Grind[illegible] Centers, Tri-He[illegible] Cutters, Carbide Ti[illegible] Solid Carbide E[illegible] Milling Cutter Arbo[illegible] Forged Tools round out the Complete Nelco Line.

SALES, SERVICE, SATISFACTION *GUARANTEED!*

Two of America's foremost manufacturers, continually conscious of quality control, will now make the world's largest standard line of cutting tools for milling machines available to progressive metalworking plants both in the United States and through export channels. A standardization of quality tooling, both Carbide and High Speed Steel, will guarantee speedy service and nonpartisan sales recommendations with the right tools for the right application from a line of more than 3000 "standards!"

(Advertisement)

Brown & Sharpe NELCO
A Tremendous Tooling Team!

BROWN & SHARPE—NELCO PLEDGE QUICK SERVICE, GUARANTEED SATISFACTION

Over 3000 quality, expertly designed, engineered and "Industry Endorsed" Carbide, Carbide Tipped and High Speed Steel Cutting Tools will soon be available through the Brown & Sharpe—Nelco distributors. This represents the world's largest line of cutting tools and accessories, manufactured by two of America's most capable and respected manufacturers.

MODERN TOOLING, MODERN DISTRIBUTION!

Modern manufacturing methods, modern machine tools, increased production requirements demand improved tooling service. Brown & Sharpe and Nelco now make the most complete line of the best in cutting tools available to progressive manufacturers everywhere, faster than ever before.

WORLD'S MOST COMPLETE LINE OF CUTTING TOOLS & ACCESSORIES

High Speed S[illegible]n Milling Cutters, Co[illegible] Cutters, Helical [illegible] Side Milli[illegible]lling Cutt[illegible] Spi-ra[illegible]ls, She[illegible]ills, T-[illegible]rs, Ke[illegible]rs, An[illegible]rs, Scr[illegible]ing Saw[illegible]tter Arbo[illegible]utter Adapter[illegible] Collets and Spring [illegible] comprise the Brown & Sharpe line.

SPECIALS, A SPECIALTY

Nation-wide distribution and tremendous production capacity guarantee expert attention and prompt delivery for all special cutting tool applications.

TREMENDOUS TOOLING TEAM

Remember: the best in cutter tooling is Brown & Sharpe and Nelco. The easiest and quickest to buy is Brown & Sharpe and Nelco. Remember this tremendous tooling team.

CATALOGS AND PHONE ALL THAT IS NECESSARY

One Brown & Sharpe Cutter catalog, one Nelco catalog and a phone are all that is needed to solve every cutting tool problem. Over 3000 of America's finest cutting tools are at your fingertips, saving anxiety—days of waiting—dollars of extra cost.

OVER 2300 "INDUSTRY ENDORSED" STANDARD HIGH SPEED STEEL CUTTING TOOLS AND ACCESSORIES!

For the first time, a modern manufacturer with 123 years of metal-working experience is anxious to answer ALL your cutter problems! A total of over 3000 Solid Carbide, Carbide Tipped and High Speed Steel Cutting Tools are as near as your phone.

Call your Brown & Sharpe-Nelco distributor now! Find out how speedily two great names—one great distributing organization—can solve all your "Standard" and "Special" tooling problems. You'll be glad you did—you'll save days and dollars!

BUY THROUGH YOUR LOCAL DISTRIBUTOR!

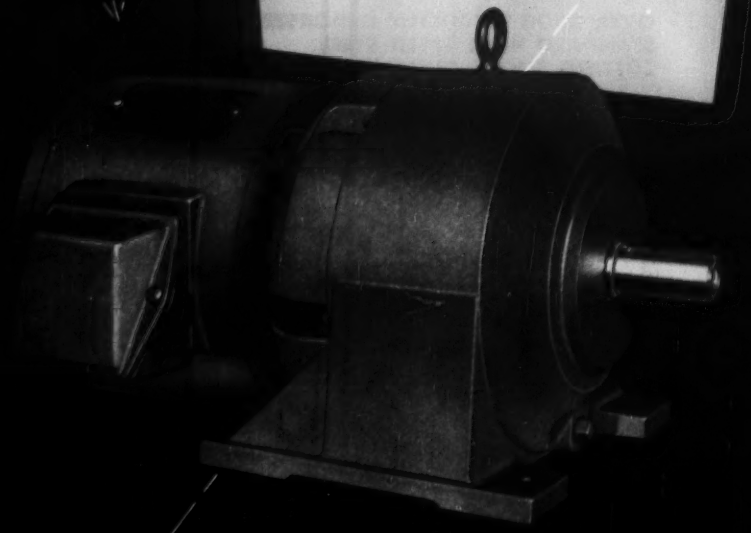
Send for Brown & Sharpe Catalog showing over 2300 High Speed Steel Tools and Accessories

B·S

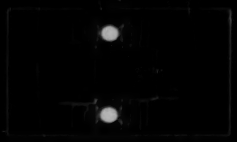
Brown & Sharpe

BROWN & SHARPE MFG. CO. • PROVIDENCE 1, RHODE ISLAND

Don't overlook what you can't see



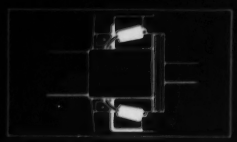
You can't always see what makes a gearmotor outstanding. It's the attention paid to small design details that makes the difference. Here are a few of the details that make the new Reliance Gearmotor stand above the rest.



FOOLPROOF METERMATIC motor bearing lubrication and oil bath gear lubrication for long-life protection against wear.

INDUCTION HARDENING of the tough alloy steel gears gives a perfect combination of wear resistance and strength.

SIMPLIFIED GEARING with few moving parts reduces friction losses and lessens chances of breakdown.



THRUST BEARINGS handle heavy overhung loads safely by placing strain on the frame instead of the shafts.

Find out the complete story for yourself— contact your Reliance representative or write for Bulletin E-2408.

REDUCE SPEED

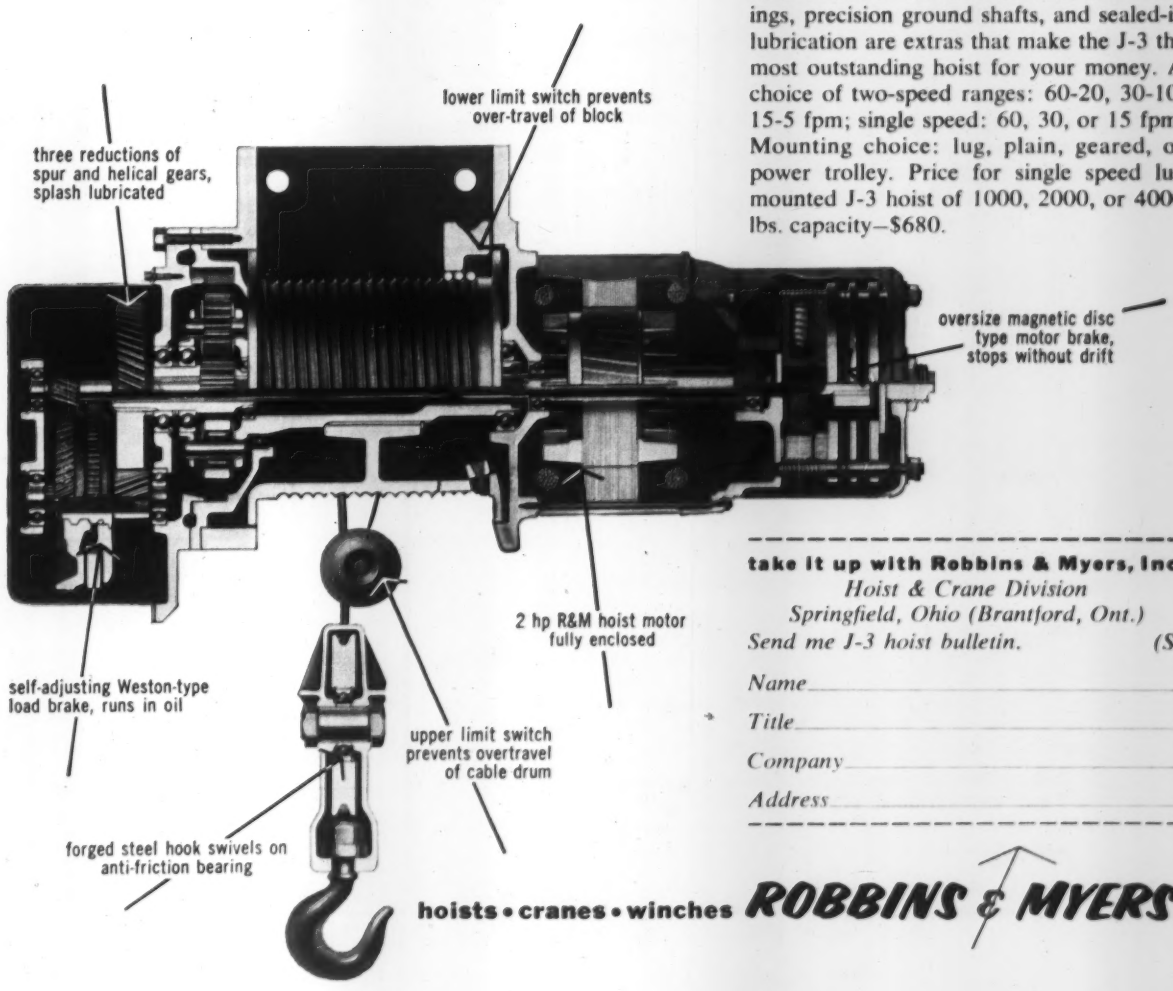
RELIANCE ELECTRIC AND ENGINEERING CO.

CLEVELAND 10, OHIO · OFFICES IN PRINCIPAL CITIES

Canadian Division: Welland, Ontario

too much hoist?

J-3 hoists have specific points of superiority that go beyond what hoist users usually consider "adequate." The 2 hp R&M high torque hoist motor, designed and built for full-time, full-load hoist duty, has the highest motor rating found in any standard hoist (30 min., 55 degrees C.), giving it ample reserve for accidental overloads. Power is transmitted through three reductions of cut helical and spur gears, instead of the usual two. Oversize ball bearings, precision ground shafts, and sealed-in lubrication are extras that make the J-3 the most outstanding hoist for your money. A choice of two-speed ranges: 60-20, 30-10, 15-5 fpm; single speed: 60, 30, or 15 fpm. Mounting choice: lug, plain, geared, or power trolley. Price for single speed lug mounted J-3 hoist of 1000, 2000, or 4000 lbs. capacity—$680.


lower limit switch prevents over-travel of block
three reductions of spur and helical gears, splash lubricated
oversize magnetic disc type motor brake, stops without drift
2 hp R&M hoist motor fully enclosed
self-adjusting Weston-type load brake, runs in oil
upper limit switch prevents overtravel of cable drum
forged steel hook swivels on anti-friction bearing

take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)
Send me J-3 hoist bulletin. *(S)*

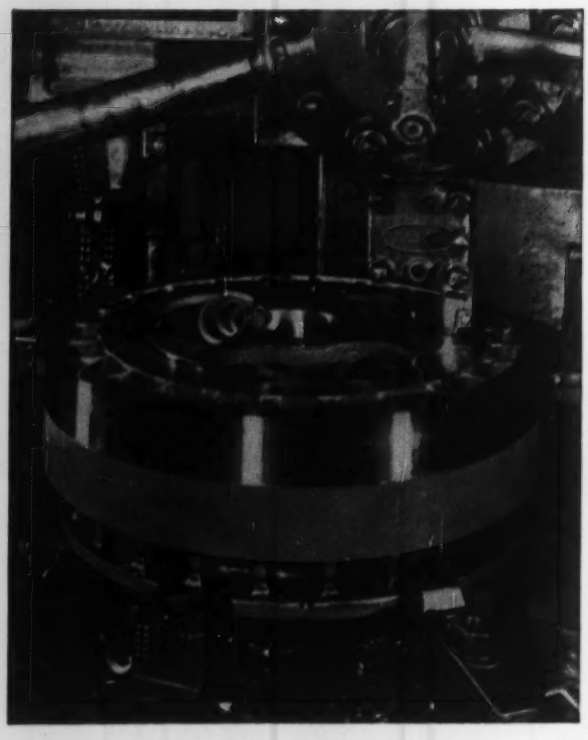
*Name*_____
*Title*_____
*Company*_____
*Address*_____

hoists • cranes • winches **ROBBINS & MYERS**

By using "Equivalent Grade" Charts when buying carbides...

YOU MAY LOSE THOUSANDS BY SAVING A FEW

Relying on "Equivalent Grade" Charts can lead to purchasing on low initial cost alone... whereas production ability really determines a tool's worth



TESTS ON 1045 CAST STEEL by a Chicago machine manufacturer demonstrate tremendous differences in carbides' production abilities. With Grade "X," as many as 16 clamp-on-type carbide inserts were required for a single facing cut on this power shovel clutch and brake drum.

A single Grade "Y" insert (Carboloy Grade 370) took nine cuts without showing any appreciable wear . . . under identical operating conditions. Result: over-all tooling cost reduced 90% on the 15-piece comparative run.

THE SO-CALLED "Equivalent Grade" Charts may be costing your plant literally thousands of dollars a year . . . in lost production, wasted manpower, higher machining expense.

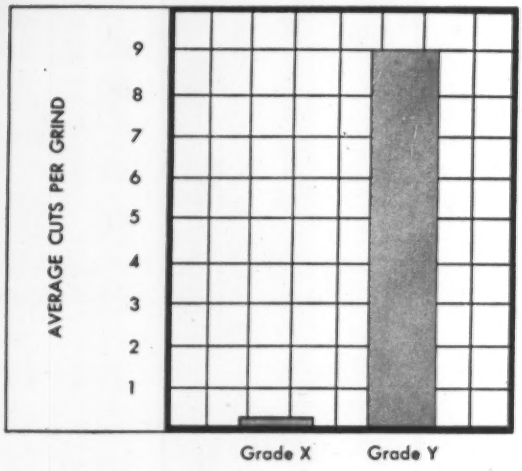
These charts conceal the tremendous differences in production abilities that always exist among various "equivalent" carbide grades. Worse, they tend to justify using initial cost, rather than over-all performance, as the basic criterion for purchasing carbide tools.

In-plant tests prove production abilities vary

What will happen to production if carbides are selected on the basis of the "Equivalent Grade" Charts? The case history at left gives the answer. It is typical of hundreds in the Carboloy files.

The average "Equivalent Grade" Chart lists no fewer than 14 different grades for this job . . . and implies that they can be used interchangeably. But in-plant comparative tests proved that no two grades could provide the same results.

When Grade "X" was selected, for example, an average of four inserts were required to take a single facing cut. But when Grade "Y" was used, a single carbide insert produced nine cuts . . . a tool life increase of 36 to 1 (Graph No. 1).



Graph No. 1—Production Ability Comparisons

OF PRODUCTION DOLLARS TOOLING PENNIES

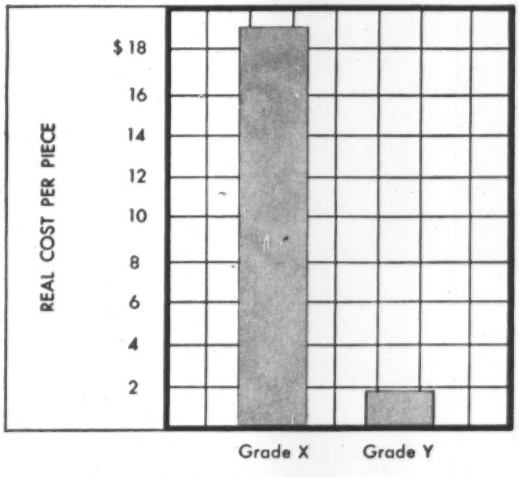
Why the tremendous difference? Grade "Y" simply had more production ability. It brought far more production per grind, reduced downtime, and drastically lowered grinding costs. Yet nothing in the "Equivalent Grade" Charts could predict this.

Initial Costs vs. Real Costs

Because "Equivalent Grade" Charts imply that all grades perform alike, they make it logical to assume that low initial cost is the most important consideration. A little arithmetic will prove that the *real* cost of carbides bears no relation to initial cost.

With Grade "X," total tooling cost for 15 pieces was $285.68 (16 tools at $13.04 each; 44 regrinds at $.41 each; 59 tool changes at $1.00 each). Machining cost per piece was $19.05.

Grade "Y" inserts cost $1.30 more initially. But total cost for 15 pieces was just $29.68 (2 tools at $14.34 each; 1 tool change at $1.00; nothing for regrinds). Real cost per piece with Grade "Y" was $1.98 . . . a reduction of 90%!



Graph No. 2—Real Cost Comparisons

Now add to these savings in tool cost, downtime, and grinding charges, the equally important savings from lower total manpower costs and reduced inventories. Then multiply the total by the number of jobs in the plant where similar cost reductions can be realized. You'll see why a few pennies more per tool is a small price to pay for carbides that can save you so much.

Cost-conscious purchasers specify Carboloy Extra-Performance Carbides

Grade "Y" in the preceding example is Carboloy Grade 370. It is one of three new, extra-performance steel-cutting carbides. These three grades – 330, 350, and 370 – cost slightly more initially because they are made by a unique and more costly process. But their performance is so superior to conventional carbides that there is no classification on the "Equivalent Grade" Charts to fit them.

Because of their extra production ability, these carbides easily show up the glaring shortcomings of the "Equivalent Grade" Charts. But even on conventional grades, actual tool comparisons prove the charts cannot be relied upon.

That's why we make this suggestion: Have comparative tests run in your own plant, on your own jobs. When the results are in, you too may find that your plant can save thousands of dollars a year simply by switching to carbides with greater production abilities.

With so much money at stake on every carbide tool used in your plant, you can easily see why the phrase "or equivalent" is rapidly becoming obsolete on tool specifications. These tests prove it really pays to specify *Carboloy* cemented carbides – by name.

If you would like a more detailed discussion of the whole subject of Initial Costs vs. Real Costs, and the fallacies of the so-called "Equivalent Grade" Charts, write today for a Carbide Sales Engineer to call on you. *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Blvd., Detroit 32, Michigan.*

"Carboloy" is a trademark of General Electric Company

CARBOLOY

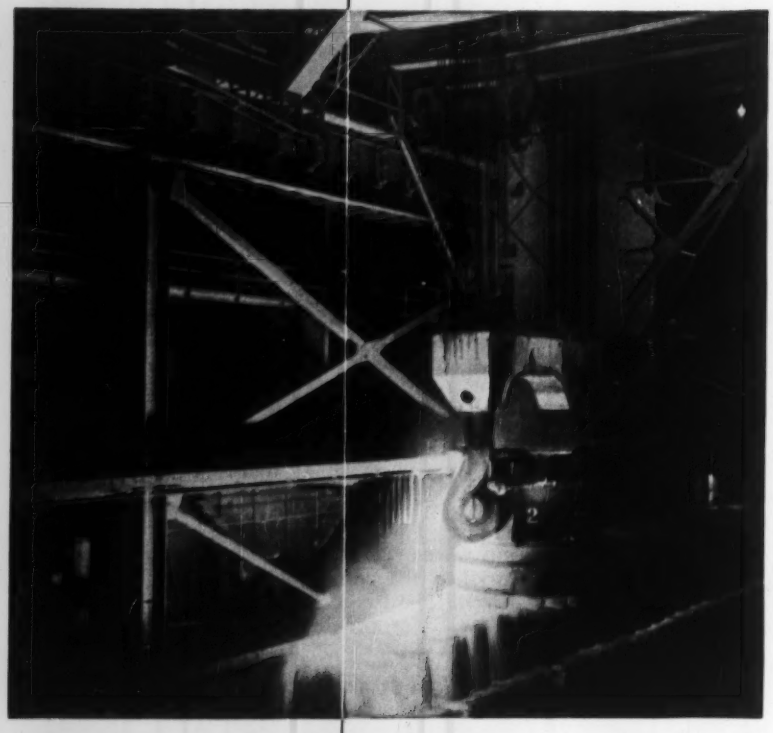
CEMENTED CARBIDES

Morgan cranes stop "on a dime"

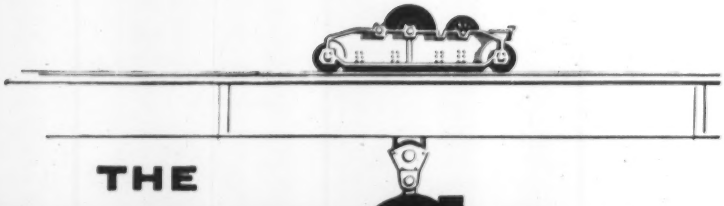
● BRAKING a Morgan crane under full load is as easy as stopping the family car.

Morgan hydraulic crane brakes provide maximum safety and pin-point accuracy in spotting heavy loads . . . another vital link in the chain of features that makes Morgan cranes best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



Positive action encourages operators to use the hydraulic brake rather than plug the motor.



The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

S.S. United States . . . most modern, fastest liner afloat

ROEBLING CF

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2345 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 5801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

Johns-Manville organizes to give you better insulation service

New and separate insulations division created to provide industry greatly improved Sales and Engineering service to meet modern problems

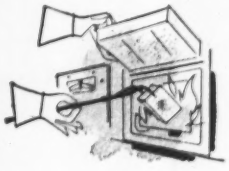
• Johns-Manville is now concentrating all industrial insulation operations within a new, fully integrated insulations division. This greater specialization makes possible the most complete insulation service available to industry. It consists of—

Sales Representatives . . . men on whom you can rely for your insulation recommendations. Your J-M salesman will help you select the insulating material exactly right for your job—the one that will provide maximum fuel savings, improved process control, and minimum maintenance. As co-ordinator of J-M's extensive research-engineering-manufacturing facilities, he offers you outstanding insulation training and experience.

Insulation Engineers—Backing up the J-M salesman on every job is the J-M insulation engineer. He is primarily concerned with solving insulation problems. He recommends the economic thickness of insulation, as well as the proper finishes, weatherproofing and securement. His highly specialized knowledge makes possible an intelligent recognition and handling of your individual insulation requirements.

Insulation Contract Units . . . Fully aware that no insulation is better than the man who applies it, the J-M Insulation Contractor makes care and skill in the scientific application of Johns-Manville insulations his stock in trade. He maintains a complete crew of estimators and mechanics trained in J-M application techniques. He is ready to give you fast, efficient service on any insulation job—large or small. Proud of his reputation for integrity in his own community, the J-M Insulation Contractor merits your complete confidence.

Complete Range of Products—In this day of exacting temperature control, the need for specific insulations for specific services is greater than ever before. Recognizing this, Johns-Manville manufactures insulations for every industrial requirement. Produced from the finest grades of asbestos, magnesium carbonate, diatomaceous silica, refractory clays and ceramic fibers, they are designed to afford maximum insulating effectiveness and durability at operating temperatures ranging from minus 300F to plus 3000F.



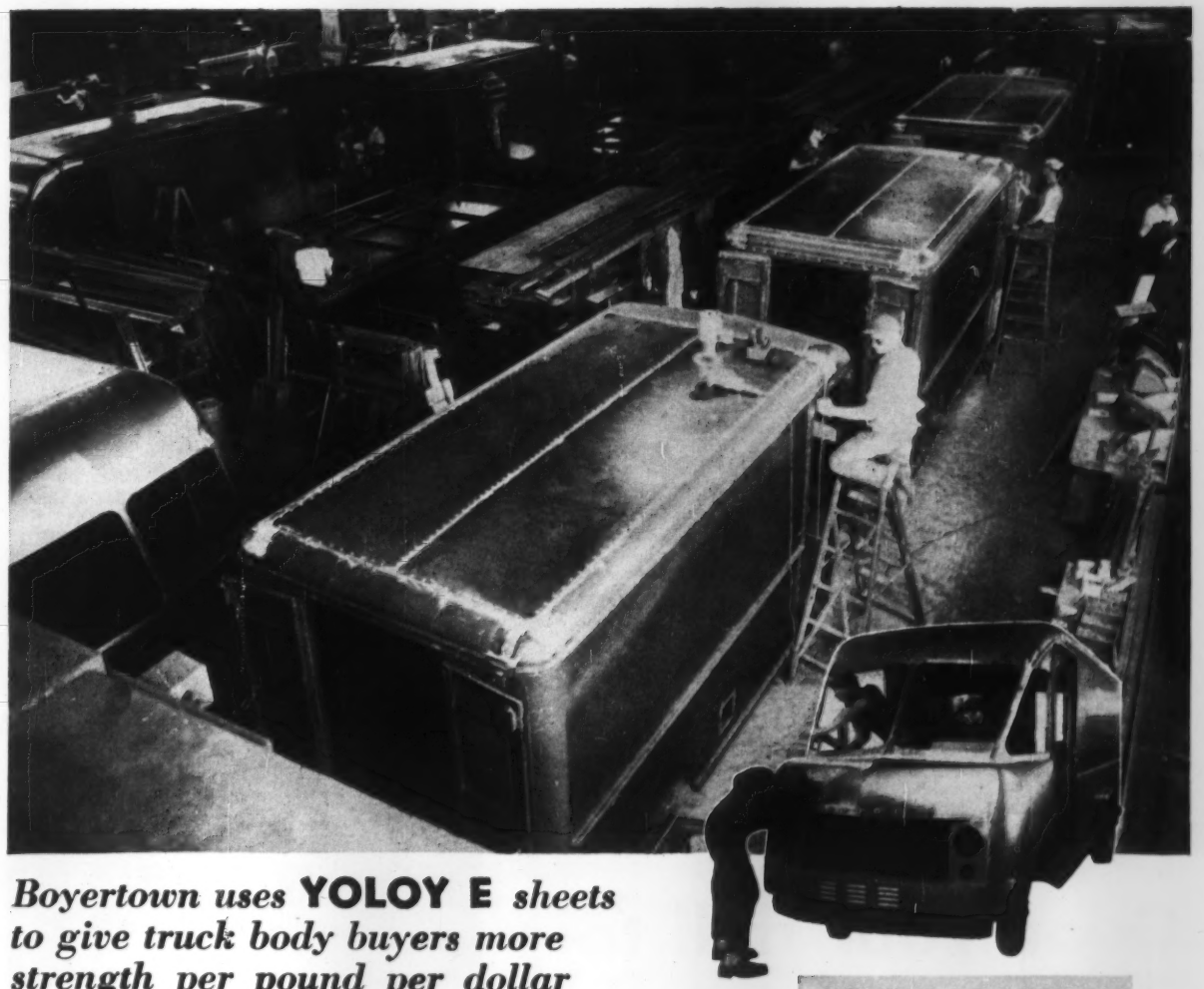
Extensive Research Facilities—At Manville, New Jersey, Johns-Manville maintains the world's most completely equipped insulation laboratory. Here insulation scientists are engaged in a continuous program of developing new and better insulating materials. In addition, their technical knowledge is always available to J-M customers whose insulation problems require special study.

Experienced Management—At headquarters as well as in the field, management of the new insulations division consists of men who, in line with J-M's promotion-from-within policy, are insulation veterans. With a realistic grasp of customers' needs, they are alert to new and better ways to serve you . . . now, and in the future.

On Your Next Insulation Job—Whether your next insulation job is big or little, simple or complex, let Johns-Manville handle it for you. Just call your nearest J-M sales office, or write direct to Johns-Manville, Box 14, New York 16, New York. In Canada, Port Credit, Ontario. *Chances are, you'll be glad you did!*

Johns-Manville *first-in* **INSULATION**

MATERIALS · ENGINEERING · APPLICATION



Boyertown uses **YOLOY E** *sheets to give truck body buyers more strength per pound per dollar*

"More strength per pound per dollar" is the theme Boyertown Auto Body Works, Inc., uses to sell its delivery-type truck bodies. Chief contributing factor to this selling argument is the high-strength material of which the bodies are made—Youngstown Yoloy "E" Sheets.

Here is what Boyertown's own advertising says about Yoloy "E"—"It's light, strong and corrosion-resistant. It absorbs the punishing stop-and-go strains of day-in day-out dairy route driving with a minimum of maintenance. This corrosion-resistance and additional strength is a premium of longer life and durability at no extra cost."

Demand for Boyertown units is at an all time high. The Company is so confident of the future success of its Yoloy "E" built equipment that a new plant is now under construction which will increase production capacity some 40%.

Every body manufacturer—in fact, every builder of machines or equipment where extra strength, lighter weight and increased corrosion resistance are important—will be interested in the unusual properties of the Youngstown Yoloy Family of Steels. Get in touch with the District Sales Office that serves your area, or write the home office.

THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY
(Nickel-Copper)
Low Alloy High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
Low Alloy High Strength Steel

YOLOY C
(Chrome-Copper)
Corrosion Resistant Steel

Youngstown

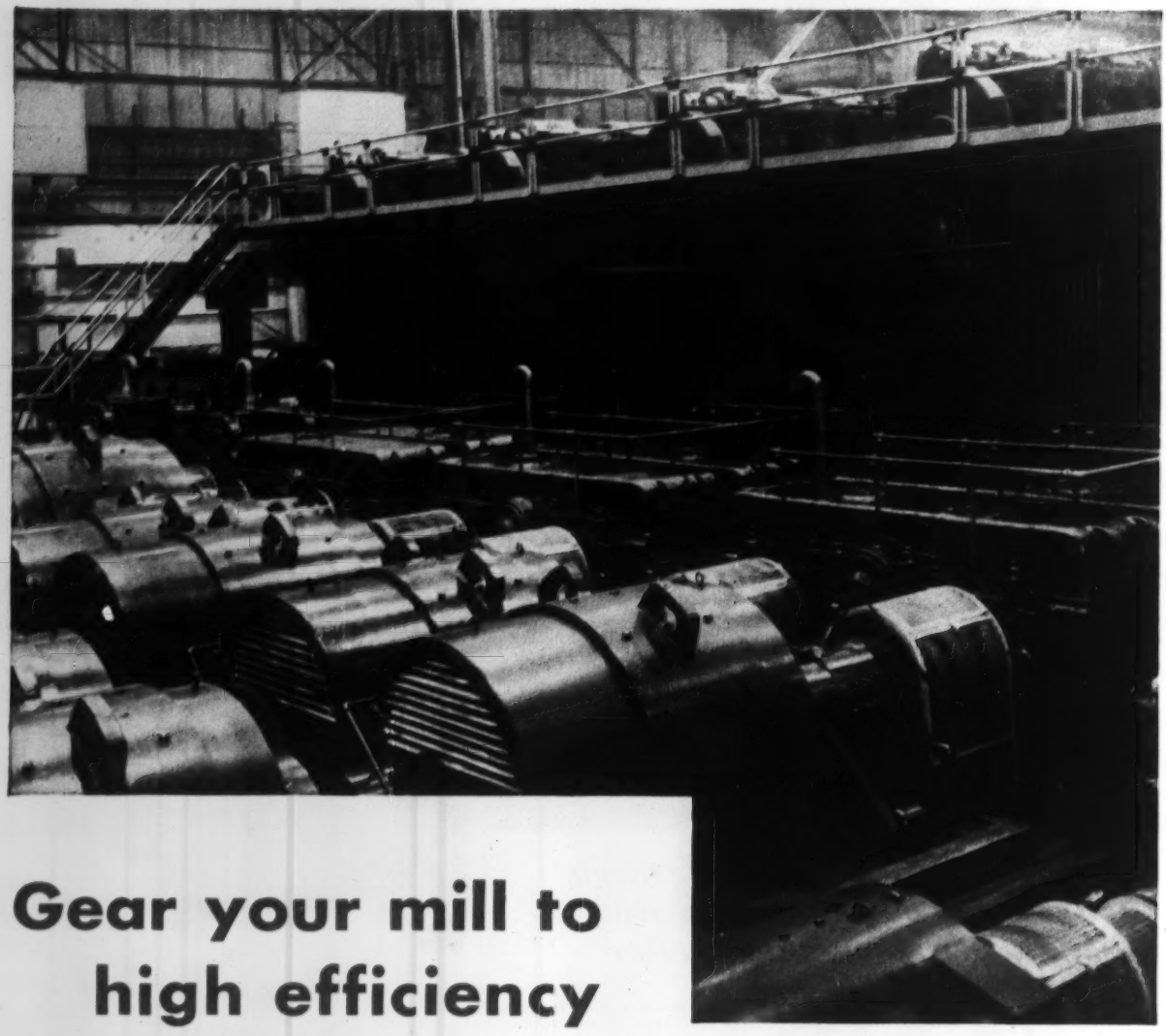
QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices Youngstown, Ohio District Sales Offices in Principal Cities

SHEETS · STRIP · PLATES · STANDARD PIPE · LINE PIPE · OIL COUNTRY TUBULAR GOODS · CONDUIT AND EMT · MECHANICAL TUBING · COLD FINISHED BARS · HOT ROLLED BARS · WIRE · HOT ROLLED RODS · COKE TIN PLATE · ELECTROLYTIC TIN PLATE · BLACK PLATE · RAILROAD TRACK SPIKES · MINE ROOF BOLTS



Gear your mill to high efficiency

Give enclosed gear drives extra protection with *Texaco Meropa Lubricant*. The longer lasting extreme pressure properties of *Texaco Meropa Lubricant* enable it to cushion shock loads and give full protection in the severest service. As a result, gears and bearings last longer, require less maintenance expense.

Texaco Meropa Lubricant contains exclusive polar additives. They give it exceptional adhesive qualities—ability to stay on gear teeth under all conditions. Moreover, *Texaco Meropa Lubricant* resists thickening, does not foam, won't separate in use, storage or centrifuging. It is non-corrosive to all gear and bearing metals.

In roll stand circulating systems, use *Texaco Regal Oil*. This turbine-quality oil resists oxidation and sludging, fully protects oil film bearings, keeps the entire system clean.

Let a Texaco Lubrication Engineer help you improve and economize your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

VISIT TEXACO, BOOTH 335, IRON & STEEL EXPOSITION, CLEVELAND, SEPTEMBER 25-28.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

STEEL

September 3, 1956

Metalworking Outlook

Labor Profile for '56

So far this year the average increase in hourly wage rates has been about 7.5 cents. That's what Associated Industries of Cleveland finds in reviewing 206 settlements made in the Cleveland area since Jan. 1. Because that district is so diversified in size of companies and kinds of products made, many labor experts think it reflects the national experience. Of the 206 contracts, 31 were for three years, 103 for two years, one for 18 months and 71 for one year. Of the 134 contracts for two years or longer, 105 had provision for deferred automatic wage increases; 29 did not. Note: A majority of the contracts were signed before the steel settlement.

Ore Boat Troubles: Pandora's Box?

Although the losses in iron ore are important, the more significant point raised by the labor troubles on 61 ships in the Great Lakes ore fleet has been: Should supervisory personnel be unionized? Pittsburgh Steamship Division of U. S. Steel Corp., the major carrier involved, won a point when men with master's licenses were excluded from voting. But mates and chief engineers were voting, and they're supervisory personnel. Win, lose or draw, the carriers may have opened a Pandora's box by even agreeing to negotiate with supervisory employees if they wish it, believe many industrial relations experts queried by STEEL.

Prospects for Nickel

Look for America to get a progressively greater share of the free world's nickel supply. The U. S. got 66.1 per cent of 215,600 tons last year. We'll receive some 72.6 per cent of 303,000 tons expected to be available to the free world by 1960. (See page 50).

New Amortization Policy Coming

Watch for the government to come up with a policy on granting five-year tax amortization (see page 52). Spurring the need for a review is a flood of requests for new steel projects. A dozen came in last week. U. S. Steel wants tax aid on a $33.1 million mill, an $8.9 million mill addition, a $17.9 million plate plant and $5 million in structural-producing facilities—all at Chicago—plus a $35 million coke plant at Gary, Ind., and two other projects, estimated at $62.2 million and $46.5 million, for mill additions. Four applications came from Inland Steel Co., totaling $40.9 million for facilities at East Chicago to produce pig iron, ingots, strip steel and other products. Youngstown Sheet & Tube Co. applied for tax help on a $24.4 million plant at Campbell, O.

Enough Ferrocolumbium

A new discovery of columbium deposits and the completion of the government's stockpiling program will make it possible for producers of fer-

rocolumbium to meet "any projected requirement of the ferroalloy," says Molybdenum Corp. of America, Pittsburgh. Ferrocolumbium is used in production of stainless steel, and it has new defense applications which are still secret. When the government began stockpiling, commercial requirements of the ferroalloy were estimated to total 3 million lb yearly. During the stockpiling civilian use dropped to less than 500,000 lb. Molybdenum officials now think usage will eventually surpass 3 million lb. Helping to meet that total will be Molybdenum's discovery of columbium deposits at Oka, Quebec, 30 miles northwest of Montreal. Union Carbide & Carbon Corp.'s Electro-Metallurgical Division is another important producer of ferrocolumbium for commercial users.

Packard for '57

Studebaker-Packard Corp. will introduce a 1957 model Packard in January. It will be produced in South Bend, Ind. Although details haven't been released, a prototype model has been developed (STEEL, Aug. 20, p. 87). The move has been made to maintain the Packard dealer organization and to keep the Packard name alive.

A Look at TV

Television expert Dr. Allen B. Du Mont forecasts these changes coming in his industry: 1. Yearly sales of TV sets will creep to 9 million annually in five years. 2. About 5 million of that volume annually will be replacement. 3. Mass-volume producers with full appliance lines will get the major share of the market, although there will still be room for a few concentrating on the inexpensive or expensive lines. 4. Mass markets for color TV are still "some years in the future."

Inflation Sidelight

A $50,000-a-year top executive in 1939 paid Uncle Sam in federal income and social security taxes over $6000 and still had almost $44,000 left. Today, that same man must gross $159,000 to end up after taxes with equivalent purchasing power. The National Industrial Conference Board points out that a junior executive or skilled worker who in 1939 earned a gross of $3000 paid only $30 in taxes and still had $2970. Today, the same man would have to earn $6122 to end up with the same net after taxes and dollar depreciation.

Straws in the Wind

Expect the national highway building program to use 4 million tons of steel a year . . . American Supply & Machinery Manufacturers' Association's July index slipped 2.24 points or 1.2 per cent to 195.56 . . . A request to boost freight rates on western railroads will be made soon . . . The shortage and high cost of raw steel have forced Hoesch Wereke, Dortmund, Germany, to postpone indefinitely construction of a $3 million pipe plant at Regina, Sask.

Costly new equipment is not always the sole answer to production cost problems. Often the wrong raw material may completely nullify expected savings from heavy capital investments in modern machinery.

Consider the case of one manufacturer who installed expensive new forming equipment but was unable to up production to the expected level. Material being formed was cold rolled strip 4" x .060", AISI 1050 steel processed to standard gauge tolerances (.0567" to .0632").

When **CMP** Precision Cold Rolled Strip Steel ordered to a 60% gauge restriction (.0587" to .0613") was furnished, production immediately moved up to the rated capacity of the machines and has remained there.

In addition to increased production, because of the minimization of down time, an incidental and important benefit was the increase in yield per **CMP** ton processed because rejections and out of tolerance parts were eliminated.

Careful consideration of **CMP** Restricted Specification Cold Rolled Strip Steel alternatives on the same careful basis given to your equipment investment, may point the way to similar, or larger pay-offs.

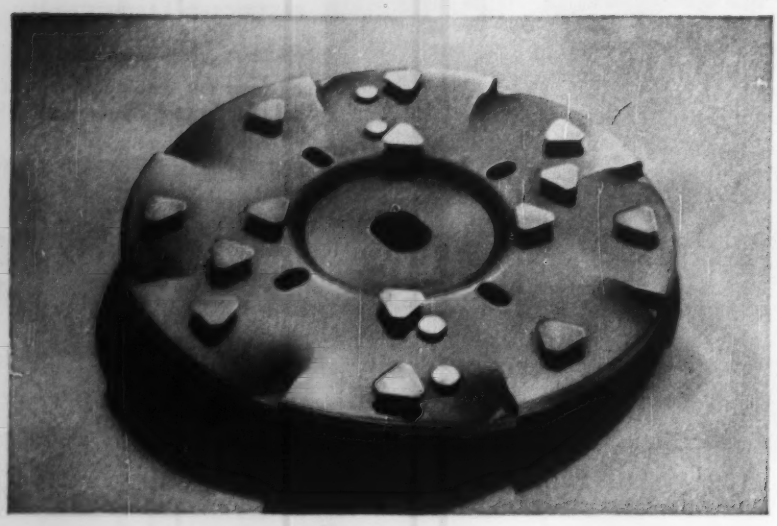
Why not check the possibilities today?

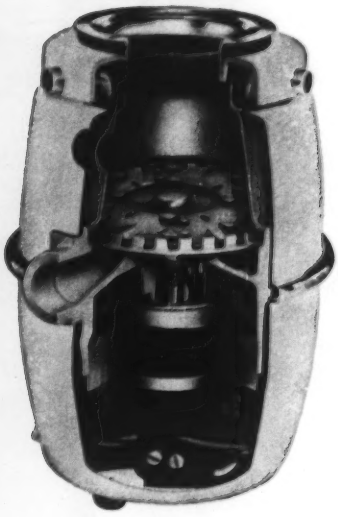
CMP
WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

LOW CARBON
HIGH CARBON
Annealed or Tempered
STAINLESS
ALLOY
ELECTRO ZINC COATED

C·M·P

THE COLD METAL PRODUCTS CO.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, IND.
SALES OFFICES: NEW YORK CLEVELAND DETROIT INDIANAPOLIS CHICAGO LOS ANGELES SAN FRANCISCO





How Armco 17-7 PH Stainless

Makes this part Last Longer, Work Better

Formerly made of chrome-plated carbon steel, this cutter disc for a food waste disposer was reducing the efficiency of the unit. The combination of corrosion and abrasion in grinding food wastes dulled the carbon steel cutting edges.

17-7 PH Solves Problems

Now the cutter discs are made of Armco 17-7 PH Stainless Steel . . . and the troubles are gone. The combination of high hardness and good corrosion resistance obtained with 17-7 PH makes the part much more durable and the cutter has a 15 to 20% faster cutting action.

Fabrication is simplified, too. The cutting blades, 17-7 PH cold-headed rivets, are attached to the formed 17-7 PH disc. Then the assembly is hardened. A simple heat treatment at 1400 and 950 F hardens the entire part to Rockwell C 40.

Unusual Properties

This cutter disc is typical of the improved performance and production you can obtain by utilizing the unusual combination of properties you get in Armco 17-7 PH. Extra high strength and hardness, good corrosion resistance and excellent fabricating characteristics give you many new opportunities to improve your product and reduce manufacturing costs as well.

Two Grades Available at Armco

Armco 17-7 PH is supplied in sheet, strip, plates, bars and wire. A companion grade, 17-4 PH—hardened at only 850 to 900 F, is produced in bars, wire and billets. For complete data on these special Armco Stainless Steels, just fill out and mail the coupon.

Armco Steel Corporation
2166 Curtis Street, Middletown, Ohio

We are interested in your new Stainless Steels for these applications: _____

Please send us information on:

- ☐ Armco 17-7 PH sheets, strip and plate
- ☐ Armco 17-7 PH bars and wire
- ☐ Armco 17-4 PH bars, wire and billets

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

ARMCO STEEL CORPORATION

2166 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Labor's New Day

Labor Day is a good time for both management and labor to appraise the implications of what might be aptly termed Labor's New Day.

Over the years labor has won many concessions and benefits—some through pressure from its union leadership, others because an enlightened management believed they marked social progress. The twelve-hour day and the sweatshop are mementos of past generations.

In recent years, social progress has been on such an accelerated scale that America no longer has a poor class, a middle class and a rich aristocracy. What we have is more like one great middle class that eats the same food, drives the same cars and wears clothing of equal quality.

For the wage earner this has meant not only a larger share of the national income in the form of higher wages but shorter working hours, better working conditions and stronger job security and benefits.

Real wages or purchasing power are up more than 50 per cent from prewar levels. The five-day, forty-hour week is standard. Brain power has been substituted for muscle power through automated production and handling equipment in the factory. Social security has been supplemented by company-financed pension plans. Newer plans even permit workers to change jobs without losing benefits from accumulated years of service.

Supplemental Unemployment Benefits for a growing number of workers make available 65 per cent of take-home pay for 52 weeks. More than two million workers are protected from rising living costs by contractual provisions that tie wages to a cost-of-living index.

But what about the future? Will there eventually be, as predicted by Walter Reuther, a 100 per cent Guaranteed Annual Wage that will cost employers as much to keep workers unemployed as fully employed? Will continuous process industries, such as steel, somehow find it necessary to go to a five-day week? Is the thirty-hour week almost at hand for many industries?

It is evident from the happenings of the last few weeks that these questions will be asked many times in the short-term future. Higher costs can be met only by raising selling prices or through greater productivity.

Management alone cannot find the answers. In creating labor's new day, management and labor leadership need to have tolerant understanding of each other's problems.

Irwin H. Such

EDITOR-IN-CHIEF

3 kinds of help on sheet and strip steel

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

1. WIDER SELECTION OF TYPES—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

2. GREATER PROCESSING CAPACITY—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

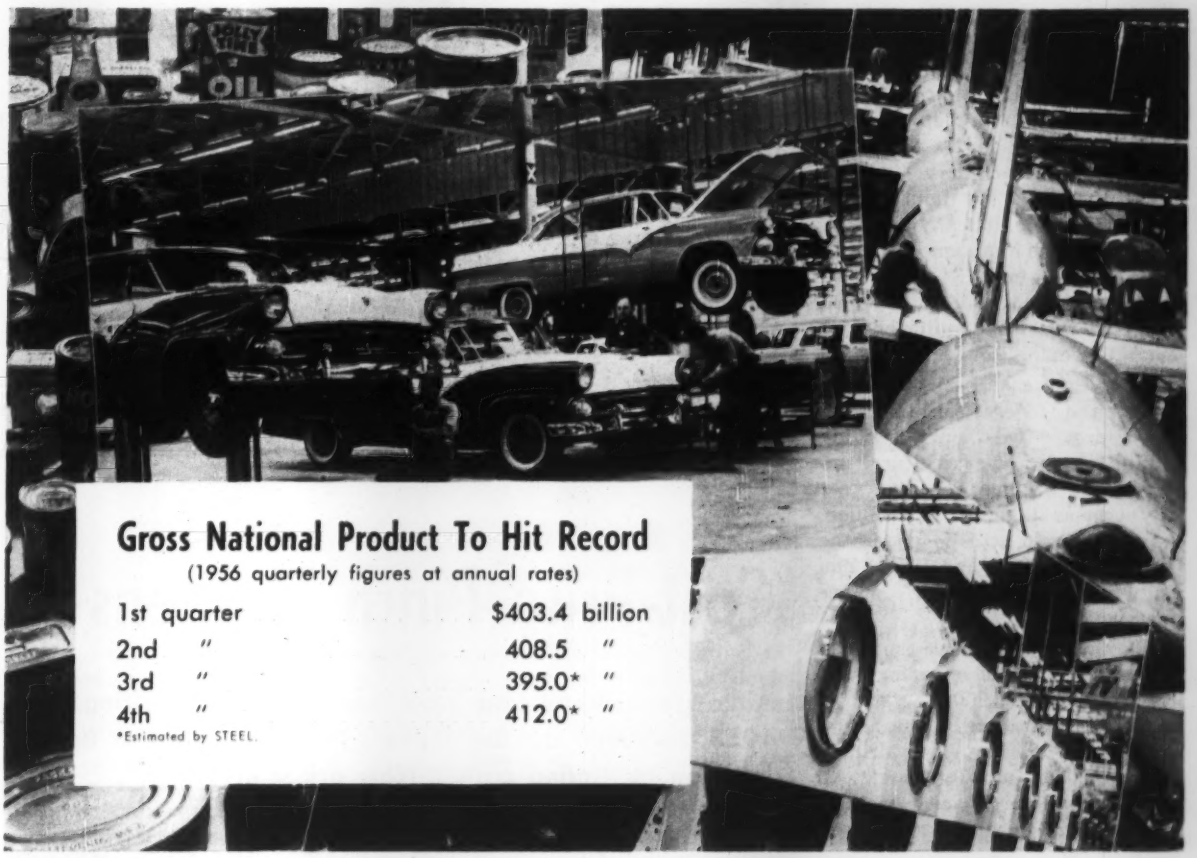
3. HELP ON SHEET AND STRIP PROBLEMS—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

RYERSON STEEL

PRINCIPAL PRODUCTS: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



Gross National Product To Hit Record

(1956 quarterly figures at annual rates)

1st quarter	$403.4 billion
2nd "	408.5 "
3rd "	395.0* "
4th "	412.0* "

*Estimated by STEEL.

Business Weather: Sunny

LOOK FOR an all-time record quarter the last three months this year.

The Federal Reserve Board's industrial production index should average 145 or better in the fourth quarter (it will hit about 140 in September). Gross National Product will reach a record annual rate of $412 billion or more. Peak steel production of 32 million tons of ingots is possible.

Sales—High activity in the last months of the year should bring metalworking sales to $138 billion in 1956, compared with $129 billion in 1955.

No major labor problems are in sight for the short term, but a shortage of steel will take a little of the bloom off prospects.

Steel-consuming industries will fare about this way:

Autos — Watch for 1.8 million cars to be produced in October, November and December. Capacity is 2.1 million, but producers will avoid overstocking their dealers. They're still worried about the possibilities of punitive legislation that could result from renewed dealer protests to Congress. The 1.8-million figure will bring total production for 1956 to 6 million autos.

Construction—This front-runner continues to set records despite the decline in new housing starts. Industrial, commercial, institutional and road building should push totals to $44 billion plus in 1956, compared with $43 billion last year.

Freight Cars — Deliveries will hold at between 5000 and 5500 a month for the rest of 1956. The shortage of plates limits carbuilders. Freight car order backlogs will continue a slow decline that began in July.

Aircraft—Sales of the 12 largest aircraft manufacturers should climb to $5 billion, compared with $4.9 billion last year.

Appliances — Activity all year has been high, in contrast with the experience in autos. The good performance will continue in the last quarter. Total unit sales will match 1955's, and 1957 will be good, too. Clothes dryers are doing especially well. An annual 4.5-million unit volume in that product is likely within the next few years.

Machinery—Production is at capacity this year in practically every line, a condition that will continue in the last quarter and

well into 1957. Machine tool builders will receive $1 billion in new orders in 1956, and a last-period spurt may enable them to ship $850 million to $900 million worth of equipment for the year, compared with $670 million in 1955 and $892 million in 1954.

Electrical Machinery — Shipments this year are limited only by capacity in practically all lines. Look for much the same performance in 1957, too. Sales of electronic apparatus will give added power to this type equipment for years to come.

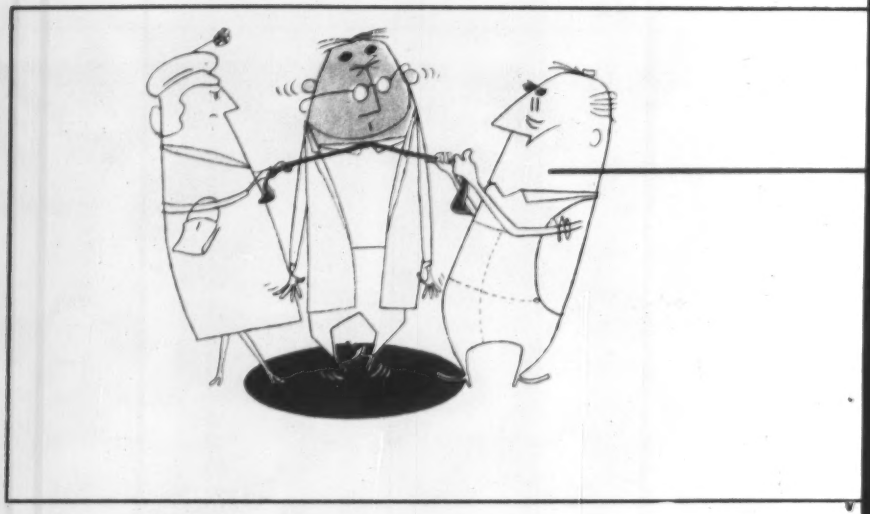
Farm Equipment—Higher farm prices, the federal aid program and improved weather are giving a fillip to sales of agricultural implements. Volume for the year may rise as high as $1.4 billion, but that would still be under the totals in both 1955 and 1954. You can expect a better performance next year.

Oil, Gas — Pipelines, especially feeder lines, will keep going well. The drilling of 60,000 new gas, oil and water wells yearly is in sight, perhaps by 1958. We're drilling about 55,000 annually now. All that adds up to capacity business for the next quarter and many more to come.

For the rest of 1956, keep your eyes on two things for a clue to what will happen in 1957: Watch the psychology among steel buyers; watch the psychology among auto purchasers.

If purchasing agents become alarmed about steel supplies in the next four months, they could get into a "buying from scarcity" mood which could result in overstocking of inventories through the first half and a consequent inventory slump in the last half of 1957. Steel stocks now probably total 12 million to 15 million tons, but they're badly distributed, a situation that could lead to shortage buying.

We will be in bad shape if the 1957 auto models do poorly. We need evidence that an 8-million car year, as we had in 1955, was not a freak. We don't have to build that many cars in 1957, but we must approach it. In the next three or four months, sales will give a good clue as to how autos will do next year.



Cost-Price Pinch Tightens

Although material and labor costs have been rising since 1953, consumer durable makers have held the line against inflation by cutting costs. Now prices must rise

LOOK FOR the squeeze between manufacturing costs and selling prices to become more acute in the next few months. Following steel's $8.50 per ton hike, the pressure will move through component and machinery prices (STEEL, Aug. 27, p. 47), to the consumer durable manufacturing level.

There the pressure will be stepped up because of public resistance to higher prices (egged on, too, by political promises of the pre-election period).

Results—Consumer durables will probably be up an average of 4 per cent. Profit margins of all but the most efficient producers will be cut. There will be more mergers; perhaps some failures.

Production costs and the selling price of a major refrigerator maker tell the story. By purchasing and manufacturing economies, his costs have dropped 3 per cent in three years. To stay competitive, he has lowered his factory selling price 11 per cent (see table).

"We've hit the bottom of the barrel," says another refrigerator maker. "Our selling price has dropped 15 to 20 per cent since 1953, while we've cut costs to the bone. Now we have to boost prices to make a profit."

Economies—Some examples of cost cutting in the refrigeration industry: 1. Use of formed plastic instead of metal. 2. Reduction of man-hours for door assembly. 3. Use of lighter gage steel because of improvements in its strength. 4. Reduction in the amount of insulation used because its quality has been upgraded. 5. Use of less wiring and tubing.

Automation has made its weight felt. The American Society of Tool Engineers estimates 10 per cent of new equipment expenditures by the heating, refrigeration and air conditioning industries in 1956 will be for automated equipment.

Cost Analysis—The pressure to hold the line against inflation works both ways, according to one component supplier to consumer durable manufacturers.

He comments: "Auto and appli-

How one manufacturer has cut costs on 12-cu-ft refrigerators since 1953

Labor costs	up 11 per cent
Purchased materials	down 13 per cent
Other materials	down 8 per cent
Fixed costs	no change
Total manufacturing cost	down 3 per cent
Factory selling price	down 11 per cent

ance people have the roughest cost analysts in the business. When we try to raise our prices to them, they check us to the nth degree. We don't get away with anything."

Here's what manufacturers have been fighting since 1953. Says the U. S. Department of Labor: The wholesale price of electrical machinery and equipment has gone up 11 per cent from 1953 (monthly average) to July, 1956; iron and steel, 14 per cent; nonferrous metals, 22 per cent.

To remain competitive, one metalworking executive estimates that raw material increases have been countered this way: Cost cutting absorbs half the increase; the distributor, about one-fourth; the dealer, another fourth.

Consumer Habits—The consumer has been paying less for his refrigerator partially as the result of discount house techniques. Where the discounter offers 25 per cent off list, manufacturers' dealers offer large trade-in allowances. Dealers can expect the pinch to be more painful with rising list prices because discounters may be expected to hold the line.

Noteworthy: While the government's wholesale price index (all commodities other than food) has risen more than 6 per cent since 1953, the consumer price index has gone up only a little more than 2 per cent.

Closed Circle—Last week, the Bureau of Labor Statistics reported the consumer price index at an all-time high of 117 (1947-49 = 100). That means about 1.25 million workers in the automotive, aircraft, electrical and farm implement industries will get pay boosts averaging 4 cents an hour.

Presumably, those pay increases will pay off for the manufacturer by giving his customers more money to spend. The average factory worker with three dependents is taking home $72.11 a week, 3 per cent more than a year ago.

Outlook—You'll pay 3 per cent more for your 1957 auto than you did for your 1956. Westinghouse Electric Corp. hiked major appliances 1 to 10 per cent; General Electric Co., 3 to 7 per cent. Radio Corp. of America is boosting the tag on black and white television receivers by 3.5 per cent. Emerson Radio & Phonograph Corp. says its air conditioning units will go up 5 to 10 per cent this month. Philco Corp. has raised refrigerator prices about 4 per cent; freezers, about 5 per cent; electric ranges, 3.5 per cent. International Harvester Co. will raise prices of farm tractors and implements 5 per cent, effective Sept. 15.

It has been a good year for consumer durables. Autos took a breathing spell, and some appliances were weaker than others, but by any standards other than record 1955's, the year stands out. The outlook for 1957 is for a near record year despite higher prices.

FTC Hits Fruehauf

The Federal Trade Commission, Washington, has charged Fruehauf Trailer Co., Detroit, with two antitrust violations.

FTC alleges that Fruehauf's acquisition of five competitors has increased its dominant position and threatens competition in violation of section 7 of the Clayton Act.

Forty-eight per cent of the industry's $371 million in sales in 1955 went to Fruehauf and its acquired companies, says the FTC.

The second complaint charges that pricing, financing, down payment, leasing and trade-in methods of Fruehauf "unduly lessen competition and unfairly divert trade from Fruehauf's competitors."

President Roy Fruehauf says his company will demonstrate that the allegations are without foundation. He gave a two-point answer to the FTC's allegations:

1. "Any acquisitions Fruehauf has made are in line with our desire to be of better service. They do not constitute a design to throttle competition." 2. Fruehauf Trailer Finance Co. has done more for the small businessman in the trucking industry than any other agency devised by private or governmental initiative. Our customers are perfectly free at all times to pay cash or to arrange their financing through any medium they desire."

A hearing is scheduled for Oct. 30 in Detroit.

Slag Processor Builds

Way-Lite Corp., Youngstown, will open a $750,000 plant this month to make building material from blast furnace slag. Raw materials will come from U. S. Steel Corp.'s Ohio Works. Way-Lite has other plants in principal steel centers.

$30 Million for Paint

Glidden Co., Cleveland paintmaker, has completed the first phase of a $30-million program to expand production of titanium dioxide at Hawkins Point, Baltimore. The program is expected to be complete, and the new units in operation, by the end of next year.

Overseas Investment Rises

Last year, private investment in foreign countries hit $29 billion. Earnings were $3.1 billion. Metalworking is showing some of the biggest gains

MORE AMERICAN dollars are going into foreign enterprises, reports the Commerce department.

Last year, private U. S. investment abroad hit a new high of $29 billion. Earnings soared to $3.1 billion.

Growth — The pace has been brisk since the war, with particular preference being shown for foreign branches and subsidiaries of U. S. companies. These direct investments have a book value of over $19 billion, compared with $7 billion at the end of World War II.

Americans have about $6.5 billion invested in Canada, the same amount in Latin America and $3.5 billion in Western Europe. By industry, manufacturing leads with $6.3 billion, petroleum is next with $5.8 billion, mining and smelting next with $2.2 billion.

Leaders—Analysis of the $2.5-billion increase in manufacturing since 1950 shows that the largest growth came in motor vehicle and chemical plants. The book value of investment in each was nearly $1 billion by the end of last year. Other fast-growing industries are primary and fabricated metals (including aluminum), machinery and rubber products.

American investment in manufacturing plant last year was highest in Western Europe. Some $200 million was split among the United Kingdom, France and Germany. Manufacturing in Latin America also proved attractive.

Building — American companies left $870 million of their record earnings from direct manufacturing investment overseas—an important source of funds for the additional investments that were made.

The Commerce department points out that these companies are supplying nearly one-quarter of our nonmilitary imports—about $2.6 billion of the total $11.5 billion. Imports from these enterprises accounted for almost one-third of all U. S. imports from Canada and Latin America.

Pay-off—Here's the explanation for last year's record earnings: 1. Many foreign enterprises formerly being developed became fully productive. 2. World demand for raw materials, manufactures and services was at record heights. 3. Prices of many commodities, especially nonferrous metal, advanced sharply.

Aluminum Oil Piping for India

Lightweight extruded aluminum pipe is a natural for rugged terrain, says Reynolds Metals Co., Louisville. A 12-mile system of this pipe is being shipped to Karachi, Pakistan. Pipe is laid above ground, and is easily moved

Civilians To Study Military

What is the relationship between a nation's economy and its military power?

Some of the answers are expected to come out of the National Resources Conference, a project of the Industrial College of the Armed Forces.

Civic groups in 16 cities (such as chambers, universities and trade associations) will join with commanding officers in the district in sponsoring the two-week sessions. Civilian conferees will enroll through the local group.

The underlying concepts are that military operations must be supplied by a civilian controlled industrial complex and that military decisions are profoundly influenced by moral, social, political, industrial, and economic factors.

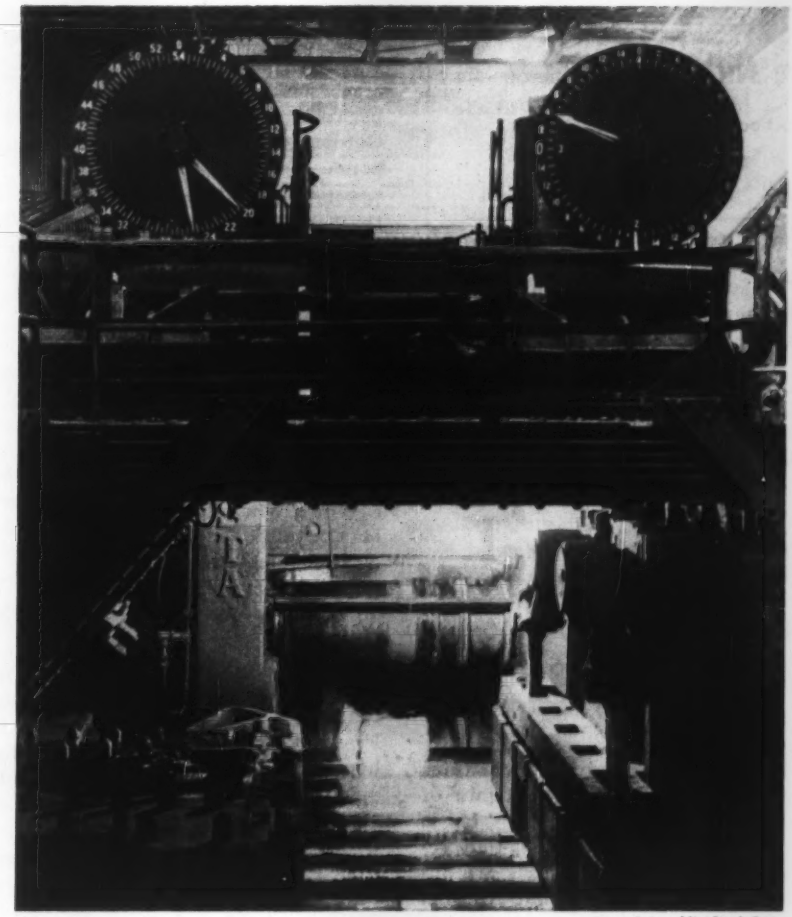
About 30 illustrated lectures, plus discussion periods and movies, will be presented by a team of officers from the Industrial College. Conferences scheduled:

1956

Birmingham	Sept. 17-28
Denver	Sept. 24-Oct. 5
Tucson, Ariz.	Oct. 22-Nov. 2
Butte, Mont.	Oct. 22-Nov. 2
Hartford, Conn.	Nov. 26-Dec. 7
Augusta, Ga.	Nov. 27-Dec. 7

1957

Ventura, Calif.	Jan. 21-Feb. 1
Beaumont, Tex.	Jan. 21-Feb. 1
Jacksonville, Fla.	Feb. 18-Mar. 1
Roanoke, Va.	Feb. 18-Mar. 1
San Antonio, Tex.	Mar. 18-29
Akron	Mar. 18-29
Hutchinson, Kans.	Apr. 15-26
Providence, R. I.	Apr. 15-26
New York	May 6-17
San Diego, Calif.	May 13-24



Jones & Laughlin Steel Corp.

Mill Builders Up Output

Steel expansion programs won't be held up by equipment shortages. Streamlined production methods and increased capacity are helping builders to meet demand

GROWTH in unfilled orders for mill equipment won't delay the steel industry's expansion plans.

Order backlogs of the three leading producers on Aug. 1, averaged 25 per cent higher than they were at the beginning of the year. But delivery time on mill equipment now averages 14 to 15 months, only one month longer than the average early this year.

Expansion—Many producers are increasing their capacities. United Engineering & Foundry Co., Pittsburgh, began an $8-million growth program in March, 1955. Its goal is a 60 per cent increase in capacity.

Mesta Machine Co., another leader in the mill equipment business, last month brought in new production at its new foundry and machine shop in New Castle, Pa. Mesta bought the plant from the government earlier this year for $8 million, after a lease held by United had expired. Mesta is rebuilding three open-hearth furnaces there. Armzen Co., Waterbury, Conn., maker of Sendzimir mills, is another firm which is adding capacity.

Streamlining—There are other answers to the problem of holding down delivery times. Wean Equipment Co., Warren, O., for example, has held its backlog at the industry's average level since last year. Standardization is one technique it is using to get more deliveries.

Blaw-Knox Co., Pittsburgh, reports that integration of the units of the former Continental Foundry & Machine Co. has eliminated duplication of customer contact and service. It's another way in which a leading maker is achieving more efficient, quicker handling of orders.

Looking Ahead—Equipment producers can plan ahead with some assurance that new capacity won't be standing idle in the foreseeable future. Next year's picture looks good. Points out Hyde Park Foundry & Machine Co., Hyde Park, Pa.: "The steel strike caused delays of one month to six weeks in some mill improvement plans. With deliveries slowed, current mill expansions will be incomplete on Jan. 1, 1957."

The need for the expansion of plate, structural, tubing and sheet steel production guarantees that new orders in 1957 will at least equal those placed this year. Aetna Standard Engineering Co., Pittsburgh, believes that oil country tubing and galvanizing facilities will also get their share of attention. Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., adds that demand is heavy for alloy steel rolling mill equipment.

Outlook — It's not all smooth sailing for mill equipment builders, however. Some trouble spots: Lake Erie Engineering Corp., Buffalo, points out that the steel shortage requires extremely careful scheduling if equipment builders are to avoid delays in production. Electric motors are giving some builders headaches. Almost all could use more engineers and skilled machinists. But while backlogs and delivery times may stretch out a little more, the consensus is that delays won't be enough to cause any real slowdown in steel expansion.

U.S. Estimates Future Nickel Supplies

(Free World production in tons)

	Canada	U.S.	Cuba	New Caledonia	Others	Totals
1960*	200,000	10,000	65,000	25,000	3,000	303,000
1957*	180,000	8,500	25,000	20,000	3,000	236,500
1956*	177,000	7,150	15,500	19,000	3,000	221,650
1955	175,150	3,800	15,150	18,500	3,000	215,600

Source: U.S. Bureau of Mines.
*Department of Commerce estimates.

Next Five Years in Nickel

Our annual supplies will go up by 77,500 tons by 1960, our share of the free world supply from 67.7 to 72.6 per cent, estimates Washington. But the metal will stay scarce

BY 1960, the U. S. will be getting 54 per cent more nickel than it did last year, 220,000 tons a year, compared with 142,500 tons.

But it's doubtful that the increased supply will bring much relief to civilian users. Unless there's a radical change in the international situation, defense uses will continue to have priority. An interim nickel report submitted to Congress by the Commerce department and the Office of Defense Mobilization is quick to point out that military needs will continue to grow.

Why — Aircraft needs are the controlling factor. The report explains: "Defense agencies do not specify the materials to be used in engine production, but require certain performance standards." The increase in thrust requirements and higher operating temperatures are calling for the use of alloys which contain as much as 20 to 25 per cent nickel. Previous specifications may have ordered alloys containing less than 2 per cent nickel.

Hindrance — Requirements for spare parts are hampering logical estimates on nickel needs for defense. Engines, which may be altered during construction or while on line, often require modifications which consume large amounts of nickel-bearing materials. It is felt, explains the finding, that requirements for spare parts are underestimated and that design changes force defense nickel totals to skyrocket.

Predicts the Department of Commerce: "Reports from industry and the military indicate that nickel-bearing stainless steel will be a must in the not too distant future for aircraft skins and structural members." Case in point: The Bell Aircraft X-2 rocket plane (1900 mph) is almost entirely composed of nickel-bearing stainless steel and K-monel (65 per cent nickel). Other defense uses for nickel: 1. Construction and maintenance materials for the atomic energy program. 2. Guided missiles. 3. Electronics.

Dollars, Cents—While the market quotation for nickel is 64.50 cents per pound, the report explains that the price may be as high as $2.25 per pound and not be classed as illegal metal. Rundown: Metallic nickel, 64.50 cents per pound, nickel oxide and sinter, 60.75 cents per pound; premium priced nickel diverted from scheduled shipments to the stockpile, 79 cents to $1.28 per pound; primary nickel from France, Japan and West Germany and nickel recovered from pure nickel scrap, $2.25 per pound. Inco refined Sherrit Gordon ores are 82.5 cents per pound.

Solution — Increased supply is the only answer to military and civilian needs, says the Department of Commerce. ODM has taken steps to intrigue new producers by offering: 1. Rapid tax amortization. 2. Governmental purchase contracts. 3. Additional financial assistance to domestic and foreign producers to cover unusual development costs in bringing in proved new ore bodies.

Who's Who—International Nickel Co. of Canada Ltd. (world's largest producer) will start initial mining operations in the Mystery-Moak lakes region of Manitoba, Canada, by the end of October (STEEL, Aug. 6, p. 80).

Two best bets to accept the government's incentive feelers are Freeport Sulphur Co. and Bethlehem Steel Co. Freeport is developing a sulphuric acid leach process for its laterite ores in Moa Bay, Cuba. If production problems are ironed out soon, full scale operations could commence by 1959. Bethlehem's Mayari, Cuba, laterite ore is the largest single reserve and could adapt to acid leach or ammonium carbonate leach processes. The ammonium process has been tested, and experts believe it may prove to be an economical method for the recovery of nickel and cobalt. Production of 5000 tons of nickel oxide in 1958 and 10,000 tons in 1959 may be possible.

Sponsored by a U.S. contract, National Lead Co. is attempting to recover nickel and cobalt from a complex sulphide ore at Fredericktown, Mo. The problem: The process calls for a ten-way separation. National Lead continues to operate the U.S. Nicaro (Cuba) nickel project which will produce some 15,500 tons of nickel oxide this year. An expansion program to be completed this fall will boost annual capacity to 25,000 tons. National Lead should be a strong bidder for the facilities when the General Services Administration puts Nicaro on the block. It is felt that

GSA will not sell the facility until substantial operating data on the expanded operation are obtained.

M. A. Hanna Co.'s silicate deposit in Riddle, Oreg., is scheduled to produce 8500 tons (contained nickel) of ferronickel during 1957.

Outlook — After the Commerce department makes its final report in December, holders of Cuban ore bodies may be offered even better terms to enter the business. Development of the Cuban properties, however, is figured in the 54 per cent gain in U. S. nickel supplies predicted by 1960. At present, only two other avenues to increased supplies are open: A crash development program of Philippine ores or early results from Inco's Ely, Minn., explorations. Either may be possible.

Republic Puts in Plating Line

T. F. Patton, new president of Republic Steel Corp., Cleveland, says the corporation will spend $4.5 million for an electrolytic zinc plating line at its Cleveland plant. Initial capacity will be 10,000 tons a month.

The line will handle coils weighing up to 40,000 lb. It's designed to permit easy expansion. Equipment includes uncoiling machines, shears, welding machines, various cleaning and dip units, a coiler and other auxiliary machinery.

Mr. Patton says that the market for electrogalvanized sheet is expanding fast. Air conditioners, food freezers and some household appliances use the material. It's useful where paint adherence is a problem. Electrogalvanized sheet is useful also for small parts, or for parts having internal channels which are difficult to paint.

Howard Electric Changes Hands

L. B. Brown, William Kearney and Rex V. Lentz of Dallas purchased Howard Electric Co., Chicago, a division of Howard Foundry Co., that city. The division makes a standardized underfloor wire distribution system. Factory and operating officers will remain at 1700 N. Kostner, Chicago; additional offices will be opened in Dallas. James W. Hudson has been named general manager of Howard Electric Co.

Research in the News

Atomic power and atomic radiation projects head up week's metalworking expansions

RESEARCH activities were again making headlines last week.

Two of particular significance: Du Pont Co., Wilmington, Del., announced plans to build a $2- million radiation laboratory. Westinghouse Electric Corp., Pittsburgh, said it was expanding its atomic power activities at the Naval Test Reactor Facility it operates for the Atomic Energy Commission.

New Materials—Du Pont expects to complete its plans by January, 1958. Construction is starting immediately. The facility is expected to supply fundamental data on current radiation projects. This parallels work on many metalworking projects around the country. Hope is that new engineering materials will come to light.

The Westinghouse announcement gives added strength to rumors of an all-atomic Navy. In addition to the expansion of the research being done on the submarine reactor, a new facility will go up for experimenting with a large ship nuclear power plant.

Sidelight — Westinghouse last week announced that its new research laboratories in Pittsburgh will be dedicated starting Sept. 12. The center was begun in June, 1953. Today, work is in full swing, with more than 700 staffers doing fundamental and applied research on many projects.

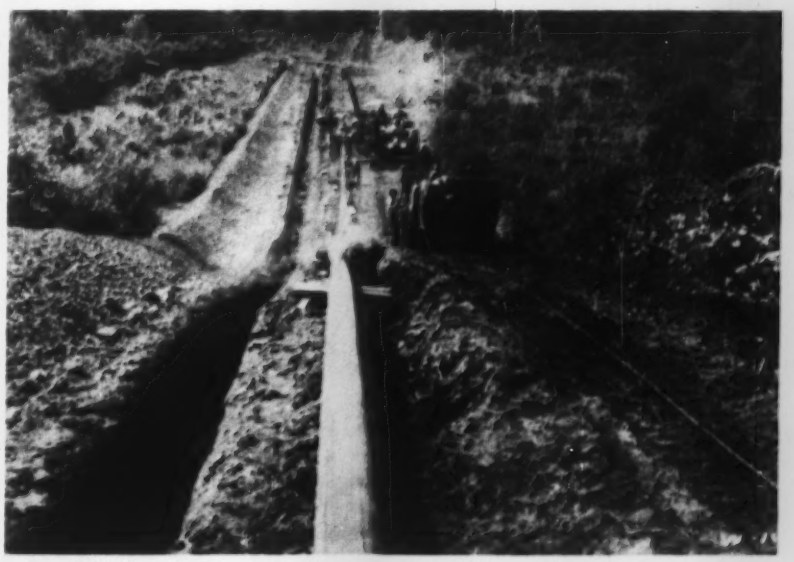
The corporation is relying heavily on expanded research activities in its comeback from the strike which stopped production from last fall through the early part of this year.

Machine Tool Expansion

Warner & Swasey Co., Cleveland, will spend $2.8 million for new manufacturing space and additional machinery and equipment, says Walter K. Bailey, president.

The expansion will be completed late next year. Aim: To increase the company's machine tool capacity by 25 per cent. Warner & Swasey's net income for the first six months of this year is more than double that for the comparable period in 1955, up from $1.25 million to $2.56 million.

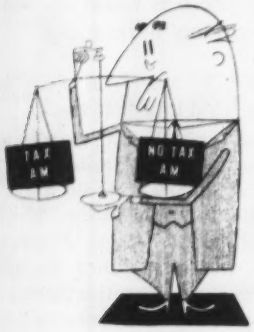
For the rest of the year, believes Mr. Bailey: "Sales and shipments of both machine tools and Gradall (the company's construction machine) will continue at high levels."



Pipeline To Move Coal from Mine to Consumer

In several months, this 10-in. pipeline will be sending coal (pulverized and suspended in water) at 3.5 mph to Cleveland Electric Illuminating Co.'s Eastlake, O., generating plant. The line will move 1.3 million tons of coal a year

Coming Up: New Decision On Fast Tax Amortization



A FIGHT'S brewing within the Eisenhower administration over fast tax amortization. Pressure to open expansion goals for steel plates, structurals and tubing opens the question of tax help for all steel projects. Washington had hoped to bypass the thorny issue, but now will study the whole write - off policy. Decision won't come before October. In the past, Commerce Secretary Sinclair Weeks and Treasury Secretary George Humphrey have wanted special amortization sharply curtailed. Defense Mobilizer Arthur S. Flemming has usually favored fast write-offs.

Why the Flare-Up?

The plate-structural-tubing question sparks a flare-up of the whole amortization issue because not much new capacity for any of those products can be built without requiring new basic ingot and other steelmaking facilities. Is it logical to make a decision about those three products without making one for related facilities? If you're making an amortization decision about as basic an industry as steel, aren't you making one that affects the many metalworking industries related to steel?

Commerce Department Sees Expansion Need

The Commerce department thinks so. The Office of Defense Mobilization asked it to make a report on the write-off matter for only the three steel products. It reported on the whole steel industry's expansion status and also drew some even broader conclusions about expansion possibilities for all metalworking. Details about the report have not been revealed, but generally it points out that steel and related industries face the need for substantial expansion over at least the next five years.

Economics To Dictate Policy

Also spurring ODM to look at the whole issue now is a rash of applications for the 30 goals still open plus a dozen new requests for tax aid on steel projects submitted Aug. 27 by U. S. Steel, Inland and Youngstown. Influencing the policy decision will be business climate estimates for the next few years. If its judgment is that a boom will continue for that period, fast amortization will be curtailed. If the thinking is that the economy will need stimulating, look for more liberal write-offs.

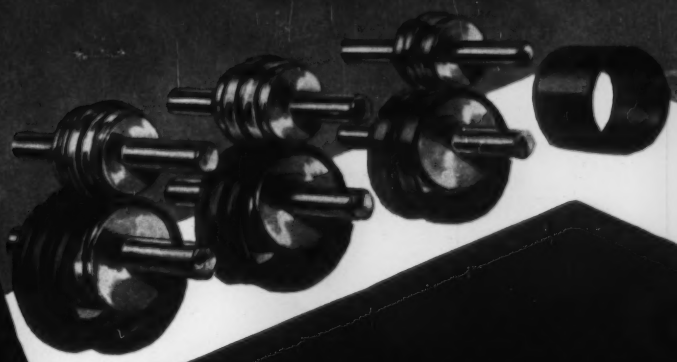
Trouble on the Seaway

Progress on the St. Lawrence Seaway has been slowed down for lack of steel plates and structurals. A Senate foreign relations subcommittee held hearings on the matter last week. Canada is unhappy about the delays. The administration also wants better results. Watch for quiet pressure on the steel companies to speed deliveries.

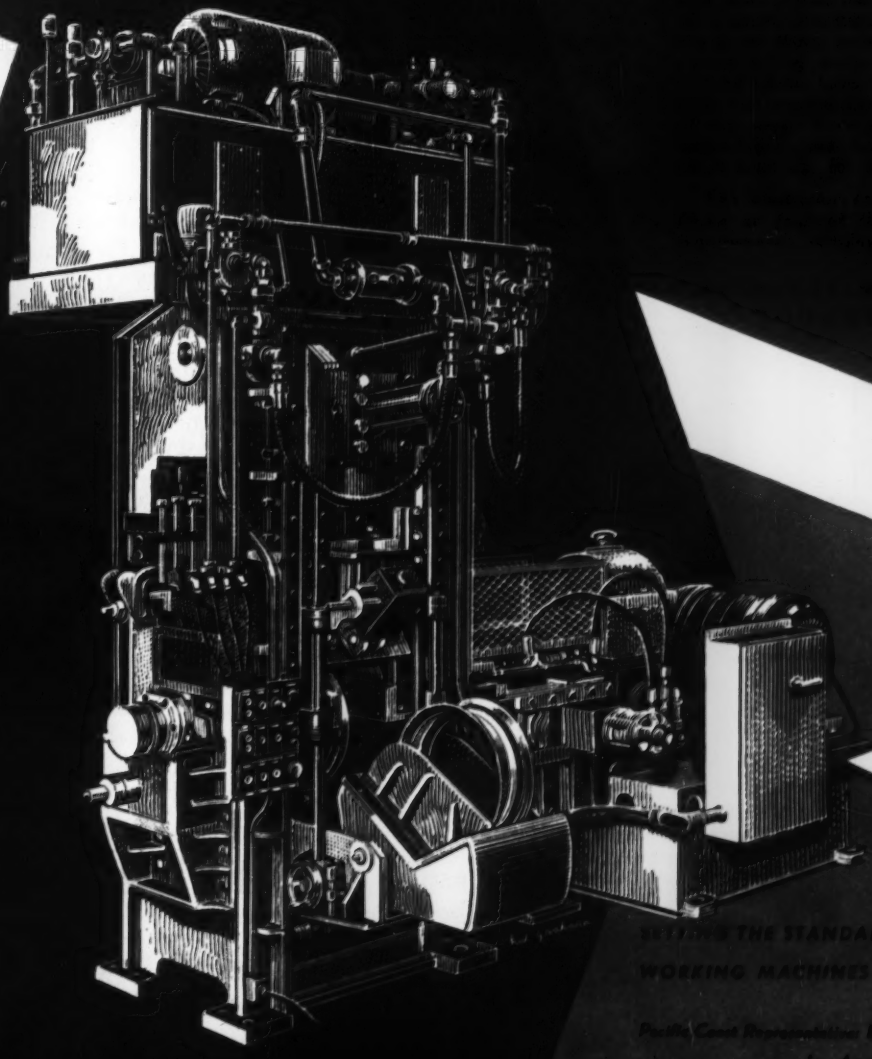
Slow Start on Scrap Study

A comprehensive study on iron and steel scrap, due to Congress next Jan. 31, is off to a slow start. It will be a three-part report—on home scrap generated by the steel companies, on scrap generated by steel consumers and our scrap reserves in obsolete machinery, old autos, etc. The first two parts will be made by the Census bureau, the third (and most difficult) by the Stanford Research Institute. Problem is to get manpower for the job.

Meet Clyde B. Jenni: The newly appointed chief of the castings branch of the Iron & Steel Division, Business & Defense Services Administration, will serve for about six months. His regular post is chief metallurgist at General Steel Castings Co., Eddystone, Pa. He has been with that firm since 1938. Mr. Jenni can be reached in Washington at STerling 3-9200, Ext. 2279. His office is 4228 Commerce Bldg.



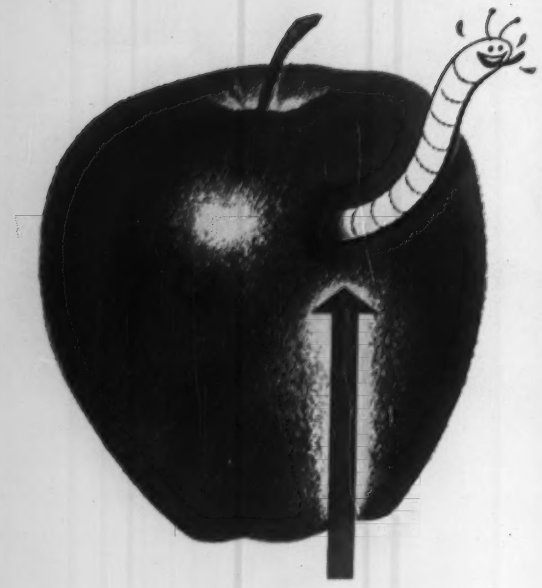
Automatic Rim Roller Line...



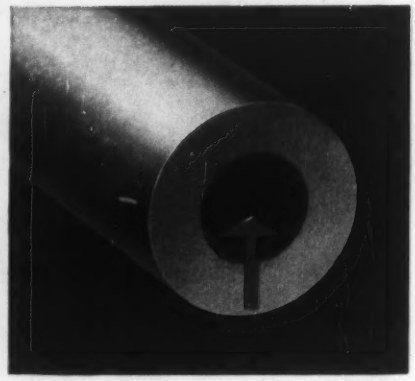
McK

SETTING THE STANDARDS OF QUALITY IN METAL WORKING MACHINES FOR TWO GENERATIONS

Pacific Coast Representatives ENGEN INDUSTRIAL COMPANY
Los Angeles, California



a hole here makes waste...



a hole here saves waste

Crucible Hollow Tool Steels save waste — time and money — whenever you need ring-shaped parts or tools with a center hole. For the hole is in the piece when you get it! You eliminate drilling, boring, rough-facing operations — save machine capacity for productive work.

And you can get Crucible Hollow Tool Steels in *any* of our famous tool steel grades . . . in bar lengths or saw cut to your individual requirements. They are made in practically any combination of O.D. and I.D. sizes. What's more, delivery is *immediate* with Crucible's popular KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air-hardening, and NU DIE V hot work tool steel grades from warehouse stocks.

Next time you have an application with a center hole, let your Crucible representative show you how these hollow tool steel bars can save you money and time. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Bob Lear Wants the Facts

"ESTIMATES can't always be right, but immediate corrective action can make a yearly or six-month forecast come true."

That remark by Robert W. Lear, general marketing manager, Plumbing & Heating Division of American-Standard, New York, characterizes his department's attitude toward finding better ways to sell and service its products. His areas of responsibility: Advertising, sales promotion, sales training, market research and product management.

A Year Ahead—Mr. Lear's department must make monthly forecasts a year in advance which serve as a basis for ordering raw materials and setting up production quotas on a six-month basis.

If at the end of one or two months, a product shows that it is running substantially below sales forecasts, the marketing department searches for the cause by: 1. Checking the product for quality and price. 2. Finding out if distributors are providing adequate service. 3. Determining if there should be a stronger advertising and promotional campaign. 4. Surveying to see if the sales force is pushing the product, etc.

Soon Enough—"By taking necessary action, we can often bring our forecasts and sales within a few percentage points of one another," reports Mr. Lear. "A great share of my time," he explains, "is spent analyzing and reviewing our results and in initiating corrective action. We can't allow a miscalculation to multiply."

New product development is another part of the marketing department's responsibility. After a thorough survey on the need for a certain unit shows affirmative results, a product development proposal is prepared. Areas covered: 1. Objectives of the product. 2. Market survey results. 3. Competitive climate report. 4. Style and performance study. 5. Desired cost and price goals. 6. Inventory considerations. 7. Manufacturing timetable. 8. Distribution policy. 9. Merchandising program. 10. Preliminary sales, profit estimates. 11. Launching costs.

"These proposals are prepared and debated with our finance, research and development and manufacturing people at several levels," he emphasizes. "When agreement is reached and the proposal is ready to go to corporate executives, it means that manufacturing has agreed that it can make the product at the suggested price, that the sales department feels it can sell the quantity suggested for the first year's production."

Future—Mr. Lear predicts: "Marketing will have to pave the way for logical management decisions. It is the department which must anticipate future customer wants."

Green Light on the Delaware

But the river-deepening project has yet to get into second gear. More money is needed. Another possible complication: Will the channel be deep enough for the Fairless Works?

THE DREDGING of the Delaware river's upper channel is at last scheduled to begin. Congress has appropriated $6 million for the work during fiscal 1957.

It still leaves a long way to go on a project which will ultimately cost $100 million.

Crystal Ball—The decision to select the bend in the Delaware river near Morrisville, Pa., as the site of U. S. Steel Corp.'s Fairless Works partly stemmed from the understanding that the channel would be deepened to handle ocean-going vessels.

Local government, civic and industrial groups—a list of organizations as long as your arm—have been driving for action. They have visions of tremendous industrial growth in the Delaware valley, plus expansion of the Port of Philadelphia's overseas trade. (The port already leads the nation in bulk cargo.)

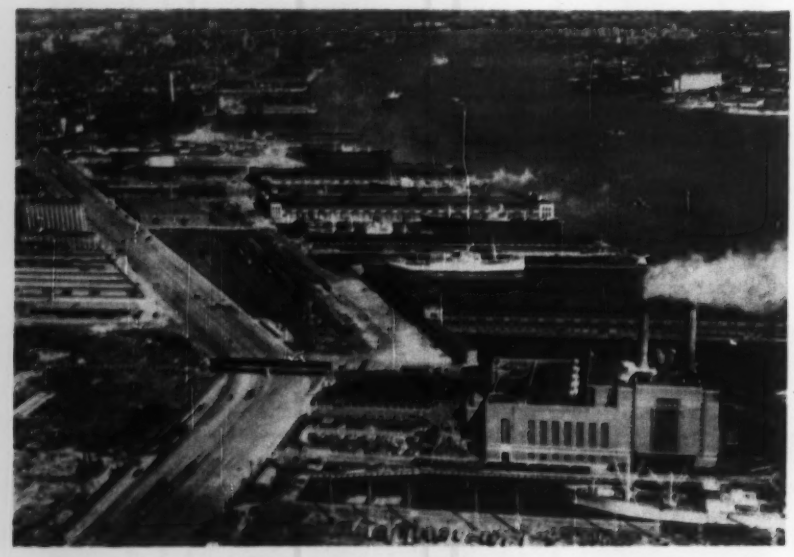
Ante Up—But the mills of Congress and the Army Corps of Engineers grind slowly. To add to the complications, the Army's chief of engineers proposed that some of the financing should come from local sources.

The Army had found economic justification for deepening the channel to 35 ft, but not to 40 ft, the depth desired for ocean vessels. In a partnership arrangement with the federal government, local interests were to ante up $18 million.

U. S. Steel reacted swiftly: "In our form of government," said Clifford F. Hood, president, "public and private funds should not be commingled to finance an improvement project belonging unqualifiedly to the public and open, without discrimination, to all who respect the laws and regulations governing its use."

No Strings—As late as the President's budget message of Jan. 17, 1955, the partnership formula remained a part of the project. But the Public Works Appropriation Bill of 1957 authorizes $6 million with no strings attached.

Significant as this first step is, another problem remains. Valley groups are now asking for a 50-ft lower channel to accommodate super-super cargo vessels now under construction in the world's shipyards.



The Port of Philadelphia leads the nation in bulk cargo

Fastener Sales Rise

Fastener sales will set a record this year in the opinion of Harry O. McCully, vice president, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Mr. McCully stated fastener sales in the first six months of this year were at least 5 per cent over those of the first half of 1955. He thinks that the remainder of the year will be at least as good as the first half.

Mr. McCully predicts the fourth will be the best quarter of the year. Third quarter totals, he says, will depend upon the speed of industry in getting assembly operations back into high gear following vacations and the steel strike.

Sales of high tensile bolts, states Mr. McCully, are the fastest growing product in his company's line of over 250,000 types and sizes of fasteners and will continue to climb.

More Cooling Units

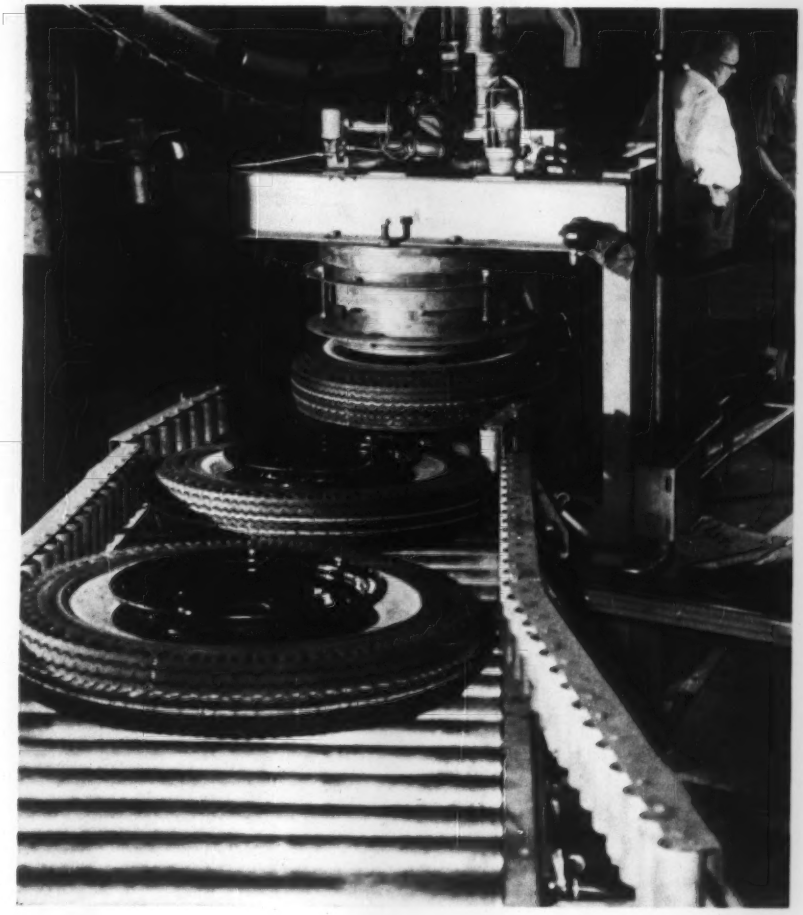
The robust growth of the air conditioning industry shows up in more places than increasing sales figures.

Chrysler Corp.'s Airtemp Division in Dayton, O., points out that the variety of cooling products is growing fast.

In the last six years, Airtemp has developed 45 new air conditioning products. Of these, 34 have been introduced since 1953.

The current list of Airtemp products is about twice its 1950 size and is still being enlarged.

Recently introduced products include room air conditioners, air cooled, central type home air conditioners, commercial packaged air conditioners (air and water cooled) with increased capacity and a number of heavy duty conditioners.



Mounting 14-inchers, Plymouth, other makers, find . . .

Small Wheels Big Headaches

THE 14-IN. wheel puts the brake engineer on the spot. To make matters worse, auto stylists are already looking ahead to 1960 and a 13-in. wheel.

Brake specialists complain: "Smaller wheels mean smaller brake drums, less cooling surface and more brake fade."

As far as the car owner is concerned, the matter boils down to this: Most of these experts agree that present brakes will do the job on 14-in. wheels if horsepower doesn't increase too much.

Next Year—Heavier cars, including Lincoln, Cadillac, Buick and Imperial will stick with the 15-in. wheel in 1957. Other makers are set to go ahead with the reduction in size, hoping that the change will be a spur to sales. They include Plymouth, Ford, Pontiac, Oldsmobile and others.

Brake men at Ford discovered that you can increase braking efficiency 5 to 7 per cent by removing the hub caps to let more air reach the drum. It's highly unlikely that any maker will take this way out. Look for enlarged fender wells to accomplish the same purpose. Another solution on the '57s will probably be wider adoption of aluminum finned drums.

Cost Factor—Because auto makers still aren't talking about the new wheel, there's no good estimate of how much the changeover will cost. Manufacturing methods and materials are about the same for both wheels, but new tooling will be a big item.

Minor changes include recalibration of speedometers and a decrease in the size of the air chuck hole in some tire rims.

It takes eight or ten dies to stamp and form the rim and spider (center disc) of a wheel. Each new model has slight variations, calling for separate sets of dies.

Tire companies have their problems, too: New molds are necessary for the different sizes of tires required. Of course, supplier industries must keep on making equipment for the 15-in. wheel for the replacement market.

New Tires—C. G. Hoover, executive vice president, Tire & Rim Association, Akron, points out: "The 14-in. program is not just a 1-in. reduction in diameter. The tires are of different sizes and sectional widths; rim sectional contours also are different. Most flanges are lower and the wells shallower."

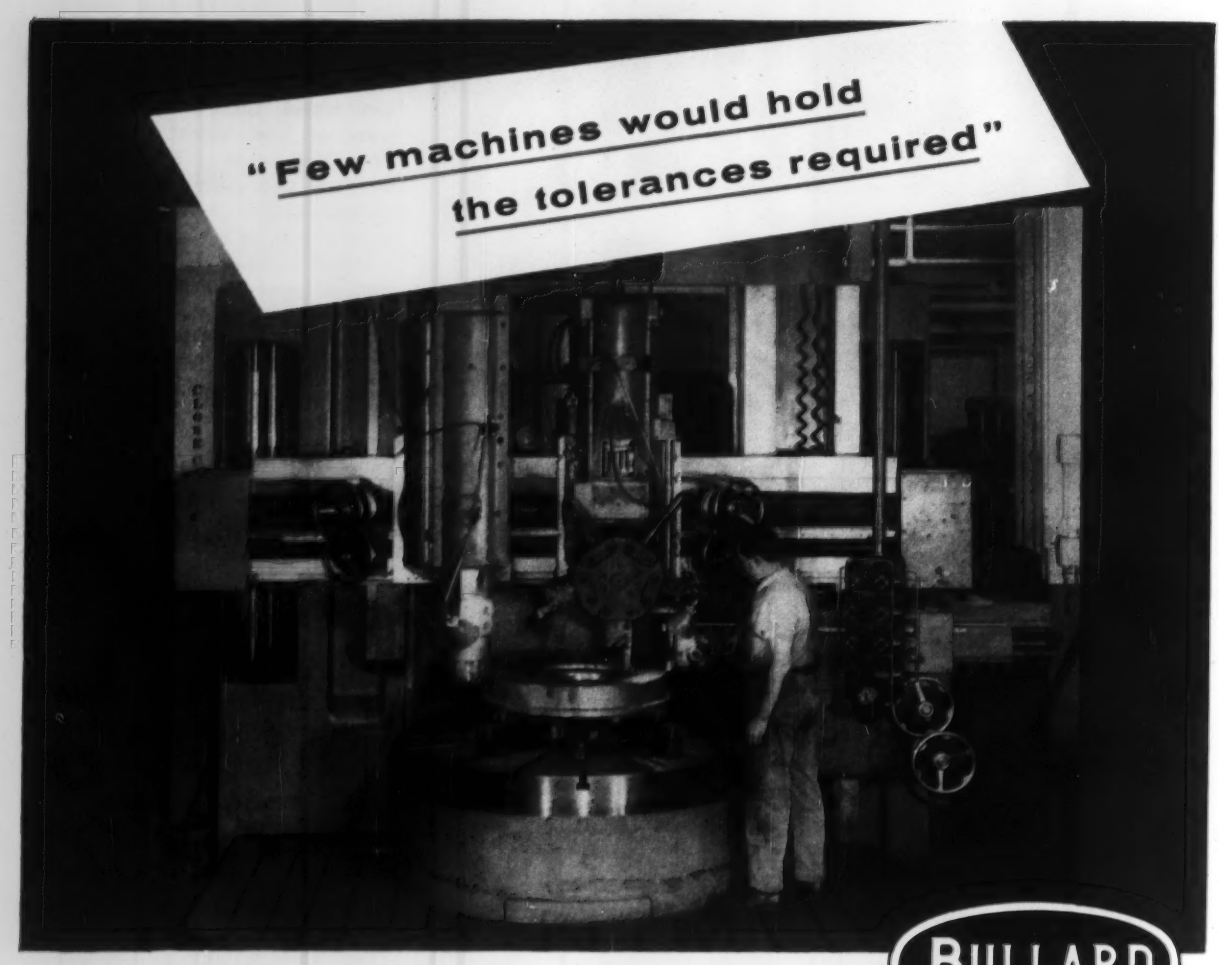
Wider tires will make for smoother riding and better traction. Cars which now use a 6.70-15 tire with a load carrying capacity of 925 lb at 24 lb of air pressure may take a 7.50-14 tire with a load capacity of 920 lb at 22 lb of pressure next year. With 24 lb of air, the new tires would have a load rating of 970 lb.

Meaning—The 1-in. decrease in wheel diameter means a drop of only ½-in. in car height. To get the lower look stylists say the public wants (many 1957 models will be from 2½ to 6 in. lower), body and frame changes pick up where the new wheels leave off.

Aircraft Get Tax Write-Offs

More than half the fast tax write-offs issued in the two-week period ended Aug. 8 were for military aircraft and parts.

Of the 22 certificates of necessity issued by the Office of Defense Mobilization more than $8.5 million out of a total of $14.5 million was for military aircraft.



This statement by Mr. R. P. Feiser, Industrial Engineer of the York Corporation, York, Pa., is one of the reasons for their purchase of a 66″ Cut Master, V.T.L., Model 75 for the machining of a rotor support for their turbomatic compressor.

Mr. Feiser further states that "the 66″ Cut Master does this machining at a saving of 40% over any previously used machine. In addition, the pendant control and power swiveling turret head are a great convenience in operation — the result is a low operator fatigue factor. Also, the York Corporation has experienced low maintenance costs on a 60″ Vertical in operation since 1928 and a 36″ Vertical in operation since 1937."

How about you?

THE BULLARD COMPANY
BRIDGEPORT 2, CONN.

Ford Economist George P. Hitchings says...

"The next six months should see a fairly stable economy. It looks like production in 1957 will be about 6.75 million cars."

"Record sales and production in 1955 did not lower this year's market. In my judgment, 1956 is turning into a base year. By 1960, the average annual production rate will be between 7 million and 8 million cars."

"Changes and the rate at which they occur are more important in forecasting than predicting an exact figure."

"The steel strike has delayed inventory accumulation and capital spending. Expansion next year will be as rapid as the supply of steel will allow."

Ford Analyst Views Future

AUTO MAKERS should produce about 6.75 million cars in 1957. By 1960, the average annual production rate will be between 7 million and 8 million, predicts George P. Hitchings, manager of Ford Motor Co.'s economic analysis department.

He hastens to add that this increase will come only if general business expansion continues at its present rates. He has little doubt that it will. Earlier this year, Mr. Hitchings forecast a 40 per cent growth in the country's economy over the next decade.

Chief—Each car division has its own staff of analysts, but Mr. Hitchings is chief prognosticator for Ford's Central Staff. His projections help top management set production and expansion plans. He has firm convictions concerning his peeks into the future.

"Exact figures are just a handy reference point. The margin of error between 6.75 million and 7 million cars is less than 4 per cent. It's more important to know there will be a change and to know the rate at which it will occur," he continues.

Testing—"We won't be able to pin down next year's output any closer until we see what public reaction to new models will be. Contrary to naive opinion, the auto industry doesn't build a set number of cars, then go out and try to sell them. We're constantly changing production schedules to meet changes in sales estimates."

Unlike steel mills and machine tool builders, the auto industry can't plan production around order backlogs. That's why it has to look ahead as far as possible. Like most forecasters, Mr. Hitchings and his staff of four analysts compile short and long-term estimates.

Short—Production scheduling in the auto industry is based to a great extent on prospects for the coming six months. "We try to get an exact idea of the next two or three months so material orders can be confirmed. The following three or four months should be pretty clearly outlined so tentative commitments can be made. These still can be canceled if it becomes necessary to do so," he says.

Current market position, rate of dealer sales and stock levels are important gages in determining this short-range outlook. The general economy also is watched closely. Other factors include current car prices, the used car market and the credit picture.

Prices—"It's difficult to increase the rate of sales if dealers are giving heavy price discounts on new cars. If the used car market is not moving, that cuts down on trade-ins and dealers will sell fewer new autos," he says. Slow credit expansion, high down payments and loan maturity rates also affect immediate plans.

Ford gets dealer orders a month ahead. At the same time, it re-

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quests a dealer forecast for the next two or three months. Unfortunately, dealers' predictions haven't turned out to be too reliable an aid. Mr. Hitchings defends the dealer, explaining: "He can only see the market as it looks in his own area. And a dealer can afford to be optimistic about the future because he knows he isn't committed to take the cars he thinks he may sell two or three months from now."

Future—Over the long haul, Mr. Hitchings follows the same factors as most economists. "The rate of consumer buying, business investments in plant and equipment, inventory accumulation and governmental expenditures all are important in the general business outlook."

Late in 1952, when Mr. Hitchings was on loan to the government as assistant director to the Office of Defense Mobilization, he said that defense readjustments and high inventories would cause a business slump starting in mid-1953. Back with Ford, he predicted the turning point and business rise. "What I didn't anticipate was the rapidity of the climb," he admits. Most economists were in the same boat.

Disagrees — As a result of the rapid recovery, auto sales hit a new peak last year. Mr. Hitchings disagrees with people who claim '55 sales robbed some of this year's market. He says a strongly expanding economy helped turn 1955 into a make-up year.

"In my judgment, 1956 is turning into a new base year, although we won't be sure until 1957 figures are in. If this is true, the automobile business will expand as fast as the rest of the economy (3 to 4 per cent annually). That means we'll produce between 7 million and 8 million cars a year by 1960. People who talk about 10 million cars by 1960 are talking about the exception, not the rule," he adds.

Build-Up—Effects of the steel strike will take a long time to spread through all levels of industry. Mr. Hitchings thinks the auto industry and business generally in 1957 will grow as fast as the supply of steel will allow.

Carbuilders won't stockpile steel in the huge quantities they did this year, he feels. Reasons: Inventory accumulation is costly and the prospect of no steel strike means auto makers at least will be able to get steel when they need it. Some steel officials already have expressed concern about excessive stockpiling by the Big Three if supplies run short.

Mr. Hitchings is optimistic. He indicates the increased prices of 1957 cars won't cut down on new car sales. "The next six months should see a fairly stable economy," he says. His opinions are reflected in Ford's expansion plans. Auto sales and production are on the way up.

GM Chases Smog

Another step in the search for ways to eliminate unburned hydrocarbons in automobile exhausts has been taken by General Motors Corp. engineers. They've taken pictures of a thin skin of unburned fuel around the walls of a combustion chamber.

Wayne A. Daniel of the GM Research Staff's Fuels & Lubricants Department says that engineers have never before been able to establish the source of unburned fuel.

Photographs taken through a quartz wall in a combustion chamber show a quench zone 0.002 to 0.015 in. thick. The relatively cool walls of a combustion chamber prevent fuel mixtures from fully igniting, he reports. Further studies may lead to a development of different cylinder wall materials or better fuels so unburned hydrocarbons can be eliminated.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804†	659,763
7 Mo. Total	3,641,291†	4,916,917
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
July 28	111,247	161,370
Aug. 4	111,152	140,788
Aug. 11	108,155	149,199
Aug. 18	98,348	138,209
Aug. 25	69,501†	129,591
Sept. 1	63,000*	85,851

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.

AMC Builds Trailer

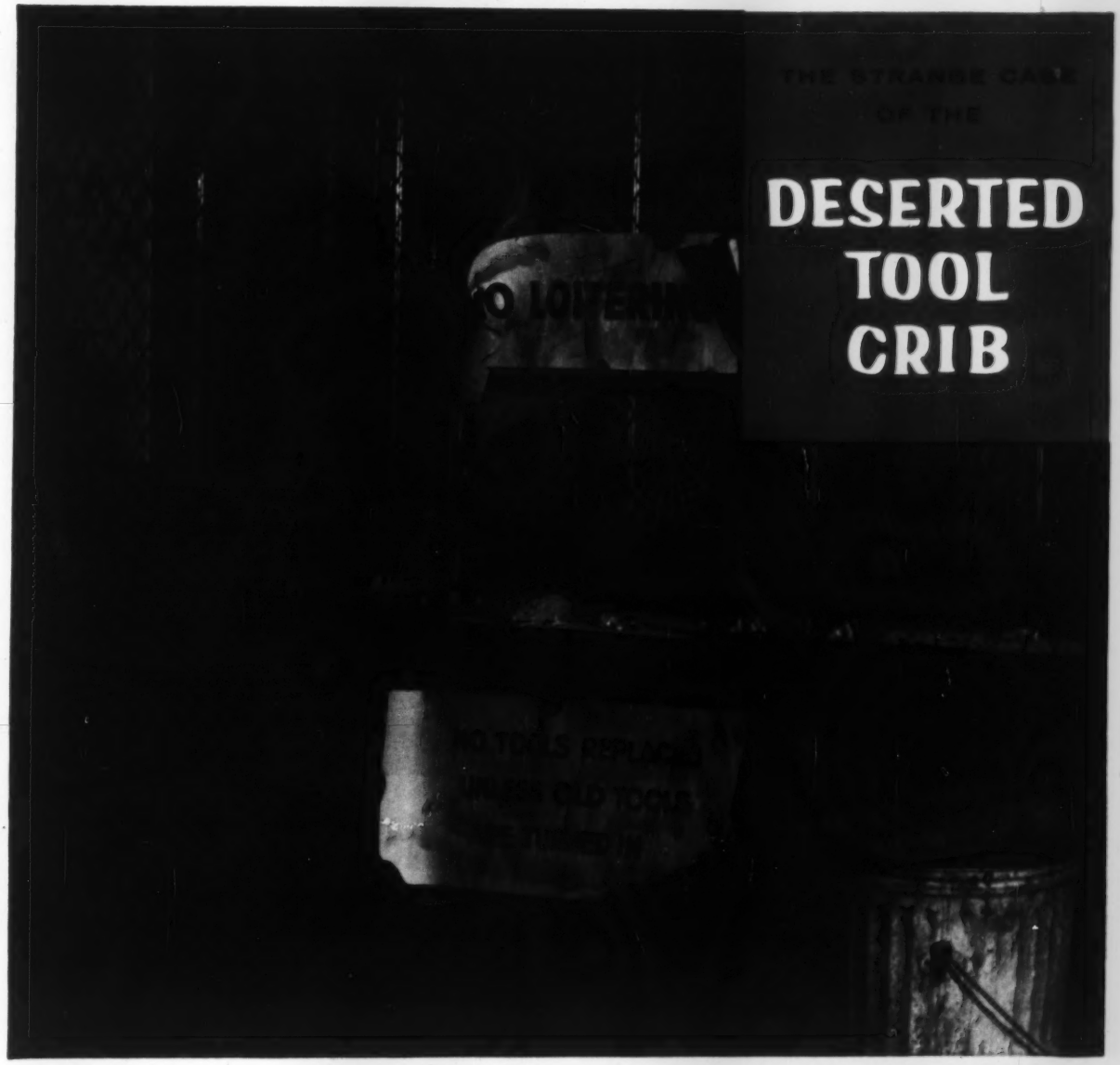
American Motors Corp. has built a cargo trailer with retractable hydraulic wheels so it can operate on roads or can be used as a sled over ice and snow.

Designed for Air Force use, the double-purpose trailer is one of a family of six, with cargo capacities ranging from 500 to 10,000 lb. Its light weight makes it a natural for air transportation.

AMC recently announced a family of lightweight, air cooled engines (See STEEL, Aug. 20, p. 88). It's possible both developments will be combined in a mobile carry-all.

Exhaust Notes

- General Motors gave hourly employees a 4-cent per hour pay boost effective Sept. 1. The revision is a cost of living increase based on the Bureau of Labor Statistics index, which jumped from 114.9 in April to 117 in July. Salaried workers will get a similar raise.
- Lincoln Division, Ford Motor Co., rolled its first 1957 cars off the assembly line last week.
- Goodyear Tire & Rubber Co., Akron, reports first half net sales of $683 million, compared with $679.7 million last year. Net income for the period was $30.6 million, compared with last year's $27.3 million.
- It's rumored that Fruehauf Trailer Co.'s aluminum extrusion plant will be in Memphis, Tenn.
- Rumors to the contrary, Chrysler is no longer having difficulty bolstering frames to take the strains of torsion bar suspension which will appear on its 1957 cars. A reliable source outside the company says the problems have been licked on frames now going into production.



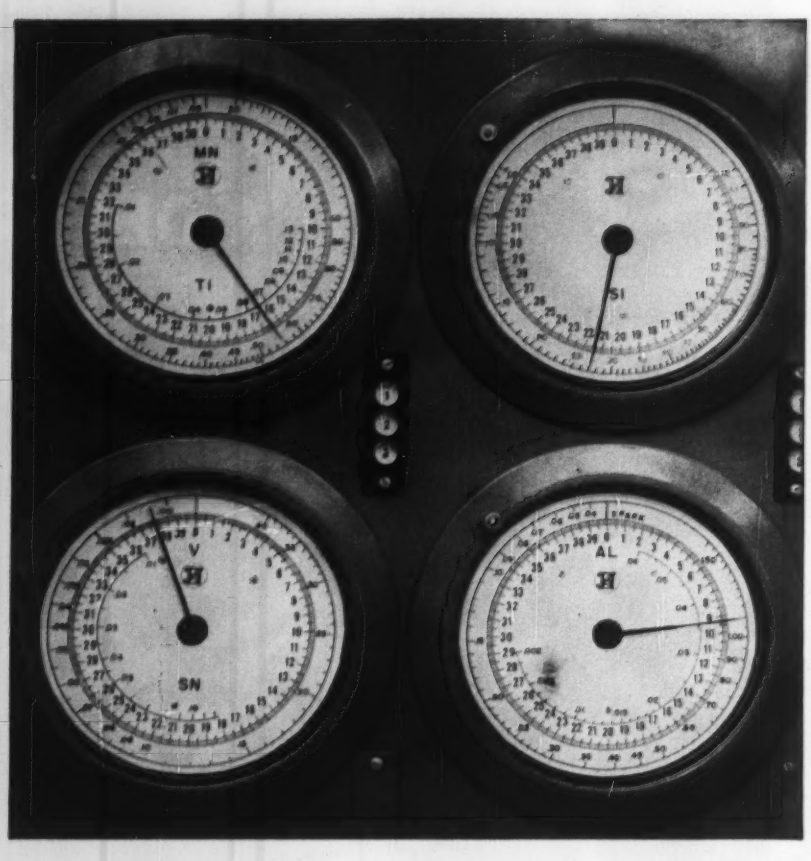
Once upon a time there was a large manufacturing company that used so many small production tools that they had to operate two tool cribs. These were the busiest places in the whole shop. High-priced machinists spent so much time lined up to replace high-priced worn-out production tools that the personnel department put the coffee machines near the tool cribs. Then business began to fall off in the tool cribs. No more lines of high-priced machinists. As a matter of fact, one tool crib was all that was needed. Personnel department got worried because the income from the coffee machines was falling off. They decided to find out why one tool crib was deserted.

The answer was quite simple. The production department had started using Copperweld Leaded Alloys. Because of its extreme machinability, tools were just not wearing out the way they had been with unleaded steels. In some cases, tools were lasting as much as 10 times as long. The personnel department moved the coffee machine. The production profits from longer tool life, faster feeds and speeds attained with Copperweld Leaded Alloys, made it one of the most important things that had happened in that plant in years.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY
Steel Division • Warren, Ohio
EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

For further details on Copperweld Leaded Alloys, write for free booklet, "Lead Treated Steels."



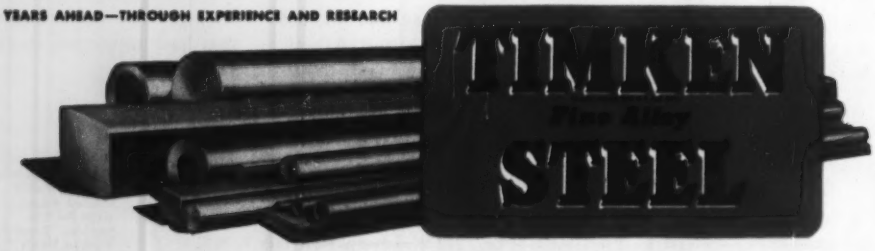
We see what's in TIMKEN® steel while we make it, to give you greater uniformity in your forgings

YOU see above four of the twelve spectrometer dials used to analyze steels being melted at the Timken Company. In just 40 seconds this direct-reading spectrometer tells the exact chemical composition of a heat of Timken fine alloy steel. Results are flashed back to the furnace so the melter can keep close control of the analysis. This carefully controlled chemistry produces uniform composition from heat to heat. You can be sure that forgings made from Timken® forging steels will give you uniformly high ductility and resistance to impact.

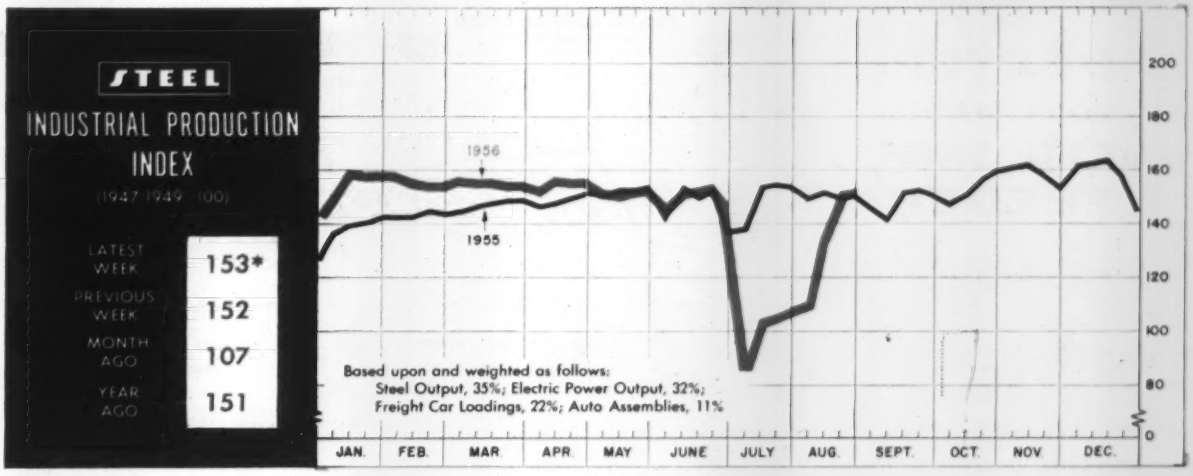
And because your order of Timken forging steel is handled individually in our mill we are able to target our conditioning procedure on your particular forging requirements. This minimizes your rejects.

Here's an added plus: Timken steel forging bars *save* you steel because their good dimensional tolerances produce uniform weight multiples with a minimum of steel lost in flashings. Get all these results in your forging steels. Specify Timken forging steels. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Aug. 25

Employment Supplies Note of Optimism

LABOR DAY, which is usually the pivotal point between the summer and fall labor markets, will signify what the name implies this year —more people will be working at the beginning of September than ever before. Crosscurrents in the nation's labor force will minimize the seasonal downturn.

August is traditionally the top month for employment, followed by a dip in September and a rise in October. Figures to be released soon by the Departments of Labor and Commerce will show that last month followed the pattern despite the aftereffects of the steel strike. The government's sampling, taken during the week ended nearest the 15th of the month, will show an increase of at least half a million persons, representing the return to work of nearly all those indirectly laid off by the strike. Add to this the normal seasonal advance, and August will go down with record employment of more than 67.1 million. As recently as last August (1955's top month) the labor force—employed and unemployed—was only 67.7 million.

Perspective—By itself, August is not an accurate barometer of the employment situation—none of the summer months is. The figures are swelled by students not normally considered as part of the labor force. This year, there were close to 1.3 million of them. But this should not hide the fact that employment in general has been unusually high. Even though the majority of steel mills were shut down for six weeks, other manufacturing employment continued strong with ample steel inventories and more than ample backlogs. When the students leave the market in September, the figures will drop appreciably, but not as much as they have in recent years.

In the first place, steel industry employment will be at top levels as the mills try to catch up on lost production. Manufacturing industries, which were increasing the tempo as August passed, will

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,376	2,359	2,255
Electric Power Distributed (million kw-hr)	11,700[1]	11,794	10,906
Bituminous Coal Output (1000 tons)	9,955[1]	9,530	9,385
Petroleum Production (daily avg—1000 bbl)	7,122	7,086	6,701
Construction Volume (*ENR*—millions)	$321.5	$258.1	$265.3
Auto, Truck Output, U. S., Canada (*Ward's*)	88,733[1]	126,675	155,225
TRADE			
Freight Car Loadings (1000 cars)	775[1]	770	792
Business Failures (Dun & Bradstreet)	289	229	216
Currency in Circulation (millions)[3]	$30,654	$30,681	$30,288
Dept. Store Sales (changes from year ago)[3]	+5%	+7%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,055	$19,788	$18,447
Federal Gross Debt (billions)	$274.9	$272.4	$276.9
Bond Volume, NYSE (millions)	$18.1	$17.1	$25.1
Stocks Sales, NYSE (thousands of shares)	8,893	9,030	9,795
Loans and Investments (billions)[4]	$86.1	$84.4	$84.2
U. S. Govt. Obligations Held (billions)[4]	$27.2	$25.8	$31.3
PRICES			
STEEL's Finished Steel Price Index[5]	225.71	225.71	210.45
STEEL's Nonferrous Metal Price Index[6]	262.3	261.8	259.1
All Commodities[7]	114.6	114.5	110.0
Commodities Other Than Farm & Foods[7]	122.3	122.2	114.4

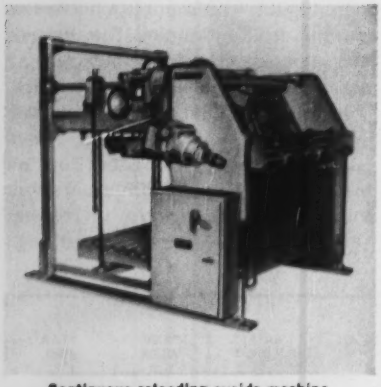
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

DEXTER
AUTOMATIC METAL SHEET FEEDER

Metal sheets, automatically separated, picked up and advanced one at a time to feeding—in point of machine to which it is attached at speeds up to 150 sheets per minute.

Should two sheets adhere, they are automatically transferred to a reject tray. Rubber suction mouthpieces and drop rollers prevent scratching.

Standard Feeder handles metal sheets from 14" x 18" up to 36" x 44" between 24 and 38 gauge stock. Feeders for larger size and heavier gauge metal sheets also available.



Continuous reloading avoids machine stoppage. New loads are placed in feeding position, while machine is operating, thus maintaining continuous automation cycle.

Dexter Feeder may be attached to Metal Litho Presses, Coating Machines, Sorting Machines, Shears, Slitters, Sprayers, Punch Presses, Stove Pipe Machines, Buffers and numerous other metal working machines.

Custom built sheet feeders for handling paper, cardboard, corrugated and other types of sheets are available to meet specific requirements. Inquiries invited.

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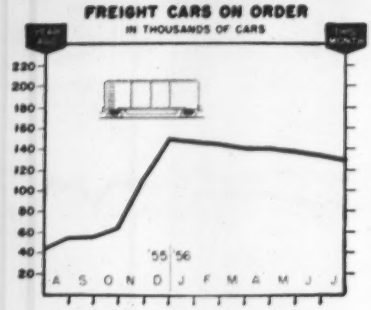
THE BUSINESS TREND

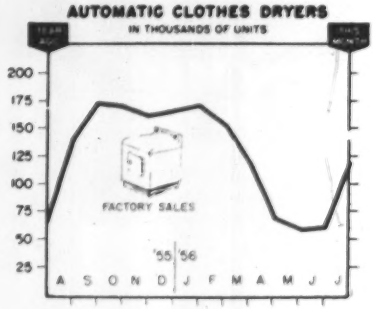
FREIGHT CARS ON ORDER
IN THOUSANDS OF CARS



	Awards		(end of month)	
	1956	1955	1956	1955
Jan.	1,818	5,087	144,946	18,395
Feb.	1,675	2,690	141,437	18,633
Mar.	1,618	2,156	137,070	17,974
Apr.	6,559	2,706	137,436	17,930
May	2,403	3,041	133,072	16,886
June	2,859	13,365	129,409	27,102
July	2,642	18,007	126,194	42,888
Aug.	....	13,405	.....	52,803
Sept.	....	3,228	.....	52,913
Oct.	....	12,843	.....	61,954
Nov.	....	51,066	.....	109,370
Dec.	....	42,278	.....	147,320
Total	....	169,872		

American Railway Car Institute.
Charts copyrighted, 1956, STEEL.

AUTOMATIC CLOTHES DRYERS
IN THOUSANDS OF UNITS



	Factory Sales—Units		
	1956	1955	1954
Jan.	166,243	115,383	82,195
Feb.	148,522	109,215	62,488
Mar.	113,031	113,498	51,796
Apr.	64,923	73,978	37,661
May	55,330	49,228	26,533
June	58,441	70,616	30,297
July	117,548	60,516	40,755
Aug.	.....	136,190	80,165
Sept.	.....	169,905	107,084
Oct.	.....	166,889	122,182
Nov.	.....	157,153	138,254
Dec.	.....	161,823	115,341
Totals	.....	1,384,394	897,751

American Home Laundry Mfrs. Assn.

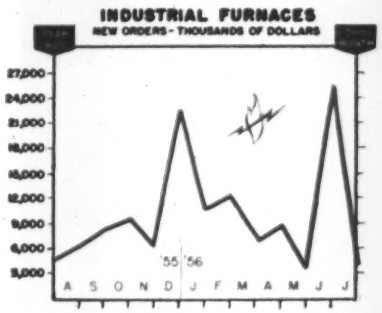
get even stronger during the third and fourth quarters. Orders and production are still at high levels, but backlogs continue to grow. The major exception to this trend is the transportation industry, where model change-overs by auto makers are causing seasonal reduction in labor. By October, this phase will be past, and total employment figures will drive to another peak just short of the record. Despite generally poor weather this year, agricultural employment is comparable to that of the same period last year. In fact, the late growing season may even keep this segment at full strength longer than usual.

Fairly Peaceful—Another significant factor in this year's labor picture: Relatively little time was lost because of work stoppages until the major steel strike. During first half of this year, there were only 2250 interruptions as long as one shift. Man-days lost totaled 12,600. In both instances, the record hasn't been that good in three of the last six years. The 1947-1949 average of man-days lost for the period is 19,900.

We're over the hump on the strike season, which means that work stoppages the rest of the year will be relatively few and insignificant. The labor force will have a chance to flex its muscles and set monthly records for the rest of the year, at least.

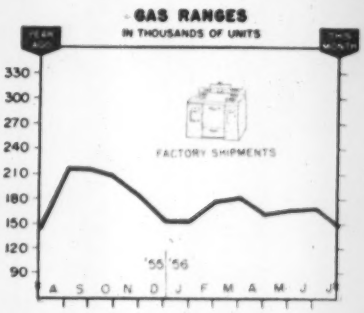
Boomlet Gets Rolling

The effect of such full employment on the nation's economy will be to sustain the boomlet set off when the steelworkers returned to their jobs. It will push the gross national product to an annual rate of $412 billion by the fourth quarter and boost the Federal Reserve Board's industrial production index to at least 145 (1947-1949 = 100). (See page 45.) There will be more money to spend and more people spending it. About the only damper is the rising cost of living. The consumer price index of the Bureau of Labor Statistics advanced 0.7 per cent from mid-June to mid-July to 117 per cent of the 1947-1949 average. (See page 46.) This will mean automatic wage increases of 3 to 5 cents an hour for more than 1 million workers under cost-of-living escalator clauses, but there will be little if any net gain in buying power. The opposite may be true: The higher cost of



	1956	1955	1954
Jan.	10,244	4,973	3,643
Feb.	12,163	5,616	3,086
Mar.	7,025	7,345	4,079
Apr.	8,803	7,639	3,496
May	3,620	6,205	5,848
June	25,597*	10,616*	5,663
July	4,140	4,338	1,664
Aug.	....	6,273	2,570
Sept.	....	8,351	2,534
Oct.	....	9,568	3,837
Nov.	....	6,180	3,188
Dec.	....	22,548*	6,847

*June, 1955, and 1956 and December, 1955, figures include steel mill furnace orders.



Shipments—Units

	1956	1955	1954
Jan.	153,500	153,400	137,000
Feb.	178,400	186,500	152,900
Mar.	181,900	218,100	188,200
Apr.	161,400	183,200	172,400
May	166,800	187,700	163,800
June	169,500	204,000	174,300
July	146,400*	146,300	134,500
Aug.	.....	220,000	179,400
Sept.	.....	219,100	203,900
Oct.	.....	210,300	197,100
Nov.	.....	184,400	174,000
Dec.	.....	153,600	147,300
Totals	.....	2,266,600	2,024,800

*Preliminary.
Gas Appliance Mfrs. Assn.

labor may increase the price of finished goods the workers buy.

Purchasing Agents Glow

New orders are on a definite upgrade, say purchasing agents. In its monthly survey, the National Association of Purchasing Agents says its members believe the remainder of 1956 will see good business. Employment is not only good now, but it will get better through the fourth quarter. Prior to the strike, the members were inclined to be pessimistic about the second half.

Vacation Hurts Shipments

For the second month in a row, net new orders for machine tools dropped below shipments. Orders for July totaled $62.1 million, against shipments of $65.4 million. Vacations cut shipments to about $10.9 million under the June figure. The estimated backlog held at the previous level of 7.8 months. The most encouraging aspect of the report from the National Machine Tool Builders' Association is the decline of cancellations to $4.5 million, the lowest total since last November.

Index Rises Fast

STEEL's industrial production index is rebounding higher and faster than expected. It reached a preliminary 153 (1947-1949 = 100) for the week ended Aug. 25, just 7 percentage points under the top mark for the year and 5 points shy of the second quarter high-mark. The difference is more than accounted for by the slowdown in the auto industry. During the last two weeks, the main strength has come from the steel and electric power industries. Electric power set a record of 11.794 billion kw-hr during the week ended Aug. 18, according to the Edison Electric Institute. This was the fifth consecutive week that the nation's electric utilities topped the 11 billion kw-hr mark.

Market Memos

- Cash dividends by corporations amounted to $732 million in July, compared with $669 million in the corresponding month of last year.
- Factory sales of standard-size vacuum cleaners totaled 259,774 in July, making the 24th consecutive month the industry has bettered its year-ago figures.

Somers

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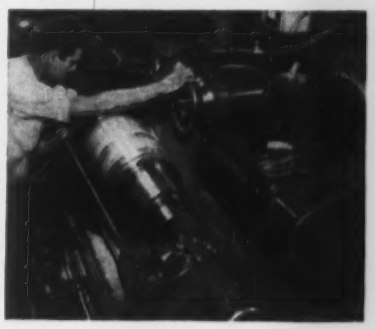

Quality control of Somers Thin Strip even includes the grinding and polishing of rolls by Somers' experts, to assure the ultimate in finish and uniformity.

Combined with the most modern rolling, gaging and annealing equipment for thin strip metal in the country, this careful attention to detail assures you of exactly the tolerance, tensile strength, elongation, finish and other physical properties to meet your precise requirements.

If you now have, or anticipate, a problem with exacting standards of thin strip metal, write for confidential data blank:

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NEW SNAP-ON MOTOR CLIP REPLACES 4 PARTS

Cuts Assembly Time and Costs!

If you manufacture or use fractional horsepower motors, this new Tinnerman SPEED CLIP® can lower your parts and assembly costs by eliminating 4-piece screw clamps to hold motors in place.

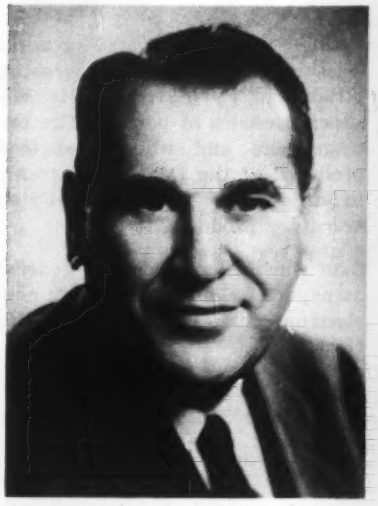
Made of high-quality spring steel, this SPEED CLIP is quickly snapped into place over the resilient motor-mounting ring, using a simple hand tool. It forms a vibration-proof lock that won't shake free. Assembly time is reduced because of the one-piece construction . . . no loose parts to handle, nothing to tighten. Parts cost and assembly cost are reduced as much as 75%!

These SPEED CLIPS can be provided in sizes to fit any fractional-horsepower motor. They are designed to hold tight even under severest vibration and high starting-torque in any mounting position.

Ask your Tinnerman SPEED NUT sales engineer for more information and arrange for samples to test on your own assembly line.

TINNERMAN PRODUCTS, INC. • Box 6688, Dept. 12, Cleveland 1, Ohio
Canada: Dominion Fasteners, Ltd., Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

TINNERMAN **Speed Nuts**®
FASTEST THING IN FASTENINGS®



EDWARD J. SHAGES
. . . v. p. of P&W divisions

Edward J. Shages was named vice president and manager, cutting tool and gage divisions, **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He was factory manager of the divisions and prior to that was superintendent of manufacturing, machinery division.

James A. Carman was made director of materials and purchasing, ball and bearing division, **Hoover Ball & Bearing Co.** and subsidiaries, Ann Arbor, Mich.

U. R. Jaeger was made sales manager, Roll-Bond products, in the **Western Brass Division** of Olin Mathieson Chemical Corp., New York.

Chester A. Chamberlain was made assistant to the president of **Diebold Inc.**, Canton, O. He was previously with E. W. Bliss Co.

Robert F. Hume was made director of purchasing, **Mueller Climatrol Division**, Worthington Corp., at Milwaukee.

Malcolm E. Fischer was made sales manager, door and frame division, **Overly Mfg. Co.**, Greensburg, Pa.

Laclede-Christy Division, H. K. Porter Company Inc., St. Louis, appointed **O. K. Warren** buyer in its purchasing department. He was purchasing agent for McQuay-Norris Mfg. Co., core division.

ROBERT A. COLE
. . . Cincinnati Gilbert sales mgr.

Robert A. Cole was appointed sales manager, **Cincinnati Gilbert Machine Tool Co.**, Cincinnati. He was vice president and sales manager with Bryant Machinery & Engineering Co.

Richard O. Straight was made manufacturing manager of **Cargill Detroit Corp.**, Birmingham, Mich. He is succeeded as sales manager by **William H. Ducker. William M. Peterson** becomes assistant manufacturing manager.

Lynn B. Hirshorn was made manager of reinforcing bars and construction specialties sales for **Bethlehem Steel Co.**, Bethlehem, Pa. He succeeds the late **S. B. Brown.**

Robert O. Wilder was elected executive vice president, **National Forge & Ordnance Co.**, Irvine, Pa.

Motch & Merryweather Machinery Co.'s machinery manufacturing division, Cleveland, appointed **R. F. Myers** sales manager; **Ray G. Knapp Jr.**, assistant to the sales manager; **C. H. Priefer**, district sales manager for the four branch offices; and **David S. Baus**, district manager for territory including the eastern seaboard, New York and eastern Pennsylvania.

Cyrus D. Dunthorn was made general sales manager, **Jarl Extrusions Inc.**, East Rochester, N. Y.

WILLIAM H. PHILLIPS
. . . Hapman-Dutton president-gen. mgr.

William H. Phillips was elected president and general manager, **Hapman-Dutton Co.**, Kalamazoo, Mich. He was vice president-general manager. **Henry W. Hapman** is now chairman.

Reed Roller Bit Co., Houston, elected **C. H. Elliott** vice president, Cleco Air Tool Division; **H. B. Book**, vice president-sales; and **J. A. Grundy**, vice president-manufacturing, Oil Tool Division.

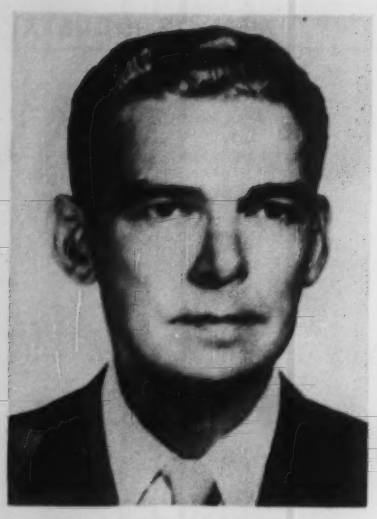
E. K. Valdschmidt was made assistant sales manager, bar sales division, **Republic Steel Corp.**, Cleveland. He succeeds **C. B. Pharo Jr.**, now assistant manager, Birmingham sales district.

H. J. Meany was appointed manager, Texas Division, for **Norris-Thermador Corp.** at Waco, Tex. He was manager of engineering, maintenance and tooling at Thermador Electrical Mfg. Co., a division in Los Angeles.

Kenneth V. Knebel was made general manufacturing manager, **New Departure Division**, General Motors Corp., Bristol, Conn. He is succeeded as plant manager at the division's Sandusky, O., plant by **Donald C. Stewart.**

Robert W. Jacksonville was elected vice president and assistant treasurer of **Rock Engineering Corp.**, Los Angeles.

C. E. Heimstadt was made plant



JAMES C. McCLOSKEY

FRED P. KRETZER

. . . appointments at National Supply's Texas plant

superintendent for **Weber Aircraft Corp.**, Burbank, Calif.

James C. McCloskey was promoted to plant superintendent at the Gainesville, Tex., plant of **National Supply Co. Fred P. Kretzer** was made chief engineer and **John O. Miller**, chief methods engineer.

Russell E. Bryant was elected manager, electrical division, at the Los Angeles branch of **Wagner Electric Corp.** He succeeds **L. G. Tandberg**, retired. Mr. Bryant was Buffalo sales and service manager.

Glenn K. Thompson was made superintendent of the new Middletown, O., fabricating plant of **Armco Drainage & Metal Products Inc.**, subsidiary of Armco Steel Corp. The new plant, now under construction, will manufacture a new type of prefabricated steel building.

Carlton E. Dennis was made midwestern sales manager for **Welsh Mfg. Co.**, Providence, R. I. He was sales manager, Sellstrom Mfg. Co.

Goodyear Tire & Rubber Co. of California, Los Angeles, elected **R. W. Maney** vice president and general manager to succeed the late **Dent W. Sanford.**

Paul J. Chaney was made commercial products sales manager, **Metals Processing Division**, Curtiss-Wright Corp., Buffalo. He was with Oliver Corp.

Wellman Bronze & Aluminum Co., Cleveland, appointed **Robert W. Spacek** superintendent of its Peerless plant.

Earl V. Akerlow was appointed an assistant division manager of **Kaiser Engineers**, division of Henry J. Kaiser Co. He will coordinate engineering of the current expansion program at Kaiser Steel's Fontana, Calif., plant.

Foster H. Pettay, senior vice president, was elected president of **Ohio Crankshaft Co.**, Cleveland. **M. J. Hoke** was elected senior vice president and general manager. He was vice president and general manager, camshaft and crankshaft division. **Paul T. Koenig** was elected secretary-treasurer of the company.

Paul R. Warren was made general sales manager of a newly created division of **Fyr-Fyter Co.** He will supervise sales of portable fire extinguishers and wheeled engines produced at the Dayton, O., plant, in addition to sales of all Fyr-Fyter accessory products.

Saul Kuchinsky was made general manager of **Burroughs Corp.'s** new electronic tube division, Plainfield, N. J.

Charles Harmon was made manager of **Chrysler Corp.'s** Detroit Tank plant.

Walter B. Herndon was made director of sales and engineering, Detroit Transmission Division, **General Motors Corp. Philip E. Cartwright** fills the new post of director of quality control and is succeeded by **Robert F. Perry** as director of work standards, methods and plant layout.

Frank H. Madigan succeeds **B. Harold Lewis**, retired, as New York district manager, grinding machine division, **Norton Co.**

Art Zrimsek was named research foundry engineer for **Magnet Cove Barium Corp.**, Des Plaines, Ill., one of Dresser Industries.

Charles E. Miller was promoted to Houston branch manager, **Carpen-**

FOSTER H. PETTAY

M. J. HOKE

. . . Ohio Crankshaft president and senior vice president

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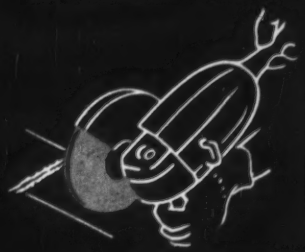

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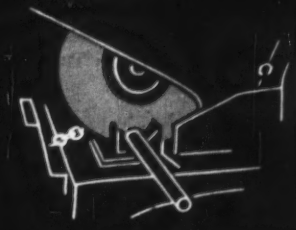

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Glass fiber reinforced for extra strength, less breakage and long life. Fast cutting on all types of metals and non-metals. Send for Bulletin ESA-243.

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JOSEPH F. KERIGAN
. . . gen. mgr. of Chrysler stamping div.

JOE E. McQUAID
. . . Electric Steel Foundry sales mgr.

GRANVILLE B. LANE
. . . Vinson Steel & Aluminum president

ter Steel Co. He was field representative.

Joseph F. Kerigan was made general manager, stamping division, **Chrysler Corp.**, Detroit. He resigned as president and general manager of New Process Gear Corp. which he joined in 1954. He previously served Chrysler as works manager of the Delaware tank plant.

Fred S. Balke was named assistant to the chief engineer, **Wheeling Steel Corp.**, Wheeling, W. Va. **Carl H. West** was made fuel and combustion engineer.

G. W. Verson was named assistant chief engineer for diecasting at **McDonald Iron Works**, San Diego, Calif.

Robert T. Charters Jr. was appointed application engineer, automatic control division, **Teller Co.**, Butler, Pa.

Joe E. McQuaid was made manager, general sales department, **Electric Steel Foundry Co.**, Portland, Oreg. He was assistant manager, construction equipment division.

William J. White was named eastern sales and service manager for the combined operations of the recently consolidated **Shallway Corp.** and **Shalco Engineering Corp.** He will have offices at the Shalco Demonstration Center in Connellsville, Pa.

Edward M. Laczynski joined **Michigan Chemical Corp.'s** research staff at St. Louis, Mich., assigned to work on rare earth metals.

A. F. Dobbrodt was named Pacific Northwest sales representative for **General Electric Co.'s** Metallurgical Products Department. He has headquarters in Seattle.

Vinson Steel & Aluminum Co., Dallas, elected **Granville B. Lane** president to succeed **Bailie W. Vinson**, now chairman and chief executive officer. Mr. Lane was executive vice president. **Fred W. Bush** becomes executive vice president in charge of operations. He was vice president-general manager of facilities in Dallas.

S. E. Gewin was appointed Chicago district manager, **Bristol Co.** He is replaced as manager at St. Louis by **Walter Messner.**

S. M. Ferguson was made Detroit district manager for **Westinghouse Electric Corp.'s** elevator division. He succeeds **R. E. Ward**, assigned to the Boston office as manager of the division's New England region.

Robert M. Jennings was appointed to the new post of director of safety for the Toledo, O., division of **Dana Corp.**

OBITUARIES . . .

Marshall Lasher, 63, a vice president of **Hubbard & Co.** and director of its Pacific Coast operations, died in Oakland, Calif., Aug. 14.

Henry A. Lindsley, 81, founder and president, Cleveland Gasket & Mfg. Co., Cleveland, died Aug. 23.

George D. Peters, 51, works manager, **Canadian Locomotive Co.**, Kingston, Ont., Canada, died Aug. 20.

Alan H. Beggs, 61, vice president, **Palnut Co.**, Irvington, N. J., died Aug. 21.

Carter N. Williams Jr., 75, chairman, **Richmond Steel Co.**, Richmond, Va., died Aug. 15.

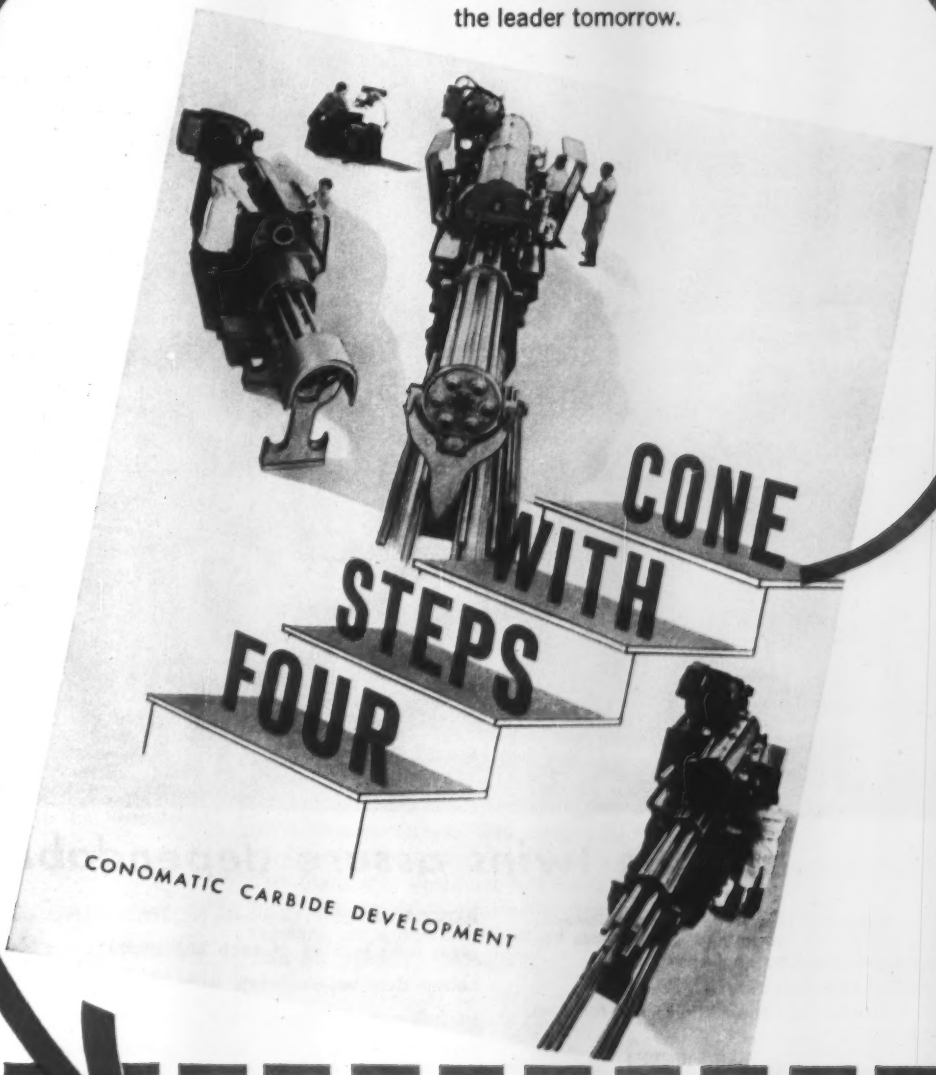
Martin Dooley, 67, vice president, **Sterling Wheelbarrow Co.**, West Allis, Wis., died Aug. 20.

Joseph Paul, 59, superintendent, **Phenix Mfg. Co. Inc.**, Milwaukee, died Aug. 19.

Roy N. Allen, 71, president, **Star Iron & Steel Co.**, Tacoma, Wash., died Aug. 16.

John Chapman, 46, secretary-treasurer, **Haggerty Tool & Die Corp.**, Detroit, died Aug. 12.

If you haven't read this important booklet, your production line may be operating at less than peak efficiency. Your operations may be beating competition with HSS today, but you will likely need carbide tooling to be the leader tomorrow.



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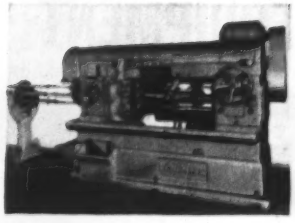

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these notable twins assure dependability

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SPAN — *96 feet 10 inches, centers of runways.*

CAPACITY — *30-tons on Main Hooks, 10-tons on auxiliary hooks.*

ELECTRICAL EQUIPMENT — *60-HP motors on Main Hoist, Auxiliary Hoist and Bridge Travel, and 15-HP motor on Trolley Travel, with full magnetic control and direct current on brakes.*

ADVANTAGES—These twin NORTHERN cranes serve twin heavy press lines located at each end of the press bay. Designed for heavy duty requirements with compensating type bridge end trucks, and equally suitable electrical equipment and controls, they dependably and safely speed machinery installation or relocation, and assure smooth, uninterrupted flow of work in today's and tomorrow's automated production.

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Plans Oil Purification Plant

Multimillion dollar facility for U. S. Steel's Clairton, Pa., Works, to be erected by Koppers. Designed to purify light oil, it will use new process to produce high-purity benzene, toluene, xylene

U. S. STEEL Corp., Pittsburgh, awarded Koppers Co. Inc. a contract to build a multimillion dollar light oil purification facility at its Clairton, Pa., Works. It will be one of America's first plants using a new process to produce super-refined benzene, toluene and xylene.

The three products are in great demand in the chemical industry which uses them as ingredients in the manufacture of many consumer items.

The plant will be constructed by Koppers Engineering & Construction Division's chemical department. U. S. Steel will operate it under rights acquired by Koppers from the German firm which developed the pressure catalytic refining process.

Cuts Impurities—Crude light oil (a chemical recovery product of the coke oven) has been purified by washing it with sulphuric acid and caustic. The new processes eliminate virtually all the impurities naturally contained in the three chemicals. The new plant also will eliminate the acid sludge disposal problem.

Construction will begin this fall and is expected to be completed in late 1957.

Refractory Plant Opens

Kaiser Chemical & Aluminum Co., Oakland, Calif., plans to put its $5-million plant at Columbiana, O., into full operation this month. It will make refractory materials, using periclase and chrome ore.

Loftus Gets Navy Contract

Loftus Engineering Corp., Pittsburgh, was the successful low bidder for the procurement and installation of a car bottom furnace at the Naval Air Materials Center, Philadelphia. This contract is under the administrative and technical control of the officer in charge of construction, Bureau of Yards & Dock Contracts, Fourth Naval District, U. S. Naval Base, Philadelphia. The work includes design and construction of a 2000°F gas fired furnace, complete with track and foundation.

CF&I Installing New Furnace

Colorado Fuel & Iron Corp., Wickwire Spencer Steel Division, Buffalo, awarded a contract to Gas Machinery Co., Industrial Furnace Division, Cleveland, to install a wire patenting furnace at its Palmer, Mass., plant. It is 40 ft long and has a lead quench tank which is 20 ft long.

Will Build Houston Warehouse

Carpenter Steel Co., Reading, Pa., will build a warehouse at Broad and Stillwell streets, Houston. C. E. Miller is the district manager. The firm makes tool steel, stainless steel and specialty alloys.

Equipment Maker Builds Plant

A new furnace plant and regional headquarters have been completed by Pacific Scientific Co. at 6280 Chalet Drive, Los Angeles. The two units occupy 31,000 sq ft. The plant was designed for manufacturing precision, automatic heat treating equipment. Cost of the over-all project: $500,000.

Forms Mosler Research Firm

Mosler Research Products Inc. has been organized as an affiliate of Mosler Safe Co., Hamilton, O., with M. S. Coleman as president. The firm is the successor to Research Products Inc., Danbury, Conn., recently purchased by Mosler Safe.

Forms Rimer Precision Casting

Rimer Precision Casting Co. has been organized in Toledo, O., to manufacture small intricate parts from ferrous and nonferrous alloys by the investment process. The firm has leased an 8000-sq-ft building in Waterville, O. Installation of machinery is under way.

Strip Mill Work Progresses

Erection of the 3200 tons of structural steelwork involved in the continuous medium strip mill being built in Brinsworth, England, is proceeding rapidly. It will be operated by Steel, Peech & Tozer, Rotherham. The $10-million mill will produce hot-rolled steel strip up to 16 in. wide and is intended to bridge the gap between output of the narrow and wide strip mills in England. It is expected to come into production early next year.

Canadian Firm Expanding

R. L. Crain Ltd., Canadian subsidiary of Standard Register Co., Dayton, O., is expanding its plant in Ottawa, Ont. The $1-million project will increase floor space by 32,000 sq ft, bringing the total to 150,000 sq ft.

Stevens Improves Facilities

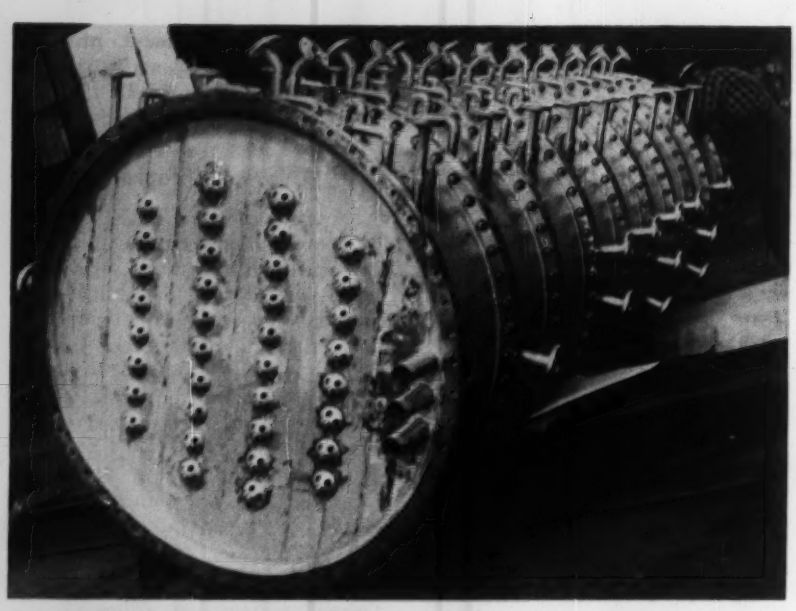
Several additions to Frederic B. Stevens Inc.'s customer service laboratory facilities have been completed. The total area for metal finishing product research, development and customer service now is 6000 sq ft.

Diamond Organizes Affiliate

Diamond Mfg. Co., Wyoming, Pa., producer of perforated metal products, established an affiliate, Diamond Perforated Metals Co., 17915 S. Figueroa St., Gardena, Calif. The new company is self-contained and fully equipped.

Nichols Chemical Building

Nichols Chemical Co. Ltd., Montreal, Que., will build a liquid hydrofluoric acid plant at its Valleyfield, Que., Works. Construction is scheduled to start immediately on a large capacity unit which will supply tonnages required by the metal, glass, petroleum, atomic energy and other industries and the company's own requirements. At present, all hydrofluoric acid sold



Stainless Steel Again Meets Atomic Age Needs

This absorber tower is made of 7500 separate pieces of stainless steel; contains 1400 ft of stainless tubing 1 in. in diameter. It is being fabricated at the South San Francisco, Calif., plant of Consolidated Western Steel Division, U. S. Steel Corp. This and a forerunner tower will be used for atomic energy research at Hanford, Wash. GE let the contract for the government

in Canada is imported from the U. S. and Europe. The firm's affiliate is General Chemical Division, Allied Chemical & Dye Corp., New York.

Toronto Metalworker Expands

Johnson, Matthey & Mallory, Toronto, Ont., manufacturer of precious metal products, will erect a 36,000-sq-ft addition to its plant. This will bring the floor area to over 100,000 sq ft.

Famco To Build Addition

Famco Inc., a subsidiary of American Air Filter Co. Inc., Louisville, will build a 60,000-sq-ft addition to its plant on Strawberry Lane, that city. The structure will be used for warehousing and for housing additional spinning machines used in the manufacture of glass fibers.

Completes Plant Addition

A 20,000-sq-ft plant addition has been completed by Surface Combustion Corp., Toledo, O. It houses the heat treat furnace and gas generator assembly department.

Leeds & Northrup Opens Office

Leeds & Northrup Co., Philadelphia, opened an office at 3513 N. Hovey St., Indianapolis. The firm makes instruments and controls. E. E. Tuttle is the branch manager.

Alloy Products Leases Space

Alloy Products Co., Marion, Ind., has taken 181,000 sq ft in the former Goodall-Sanford textile mill, Sanford, Me., for the production of jet engine components.

Bickford & Francis Renamed

Bickford & Francis Belting Co. Inc., Buffalo, changed its name to Industrial Transmissions Inc. The firm distributes power transmission and conveying equipment.

Fischer & Porter Building

Fischer & Porter (Canada) Ltd., Toronto, Ont., is erecting a 14,000-sq-ft addition to its plant. It will permit the manufacture of equipment previously imported from the U. S. and represents a plant expansion of over 100 per cent during the last three years.

CONSOLIDATIONS

Shallway Corp., Connellsville, Pa., and **Shalco Engineering Corp.**, Palo Alto, Calif., foundry equipment manufacturers, have consolidated. William J. White was named eastern sales and service manager for the combined operations. Frank K. Shallenberger is president of Shalco Engineering.

Certain assets of **Graton & Knight Co.**, Worcester, Mass., have been transferred to **Aetna Industrial Corp.**, New York. Graton & Knight's Worcester plant and all its affiliates, except International Packings Corp., Bristol, N. H., will be operated as part of the Aetna organization. Graton & Knight Co. will change its name, and a new corporation, Graton & Knight Co. Inc., will be formed to continue operations. David S. Williams is president of Graton & Knight; Walter W. Weismann, chairman of Aetna.

NEW ADDRESSES

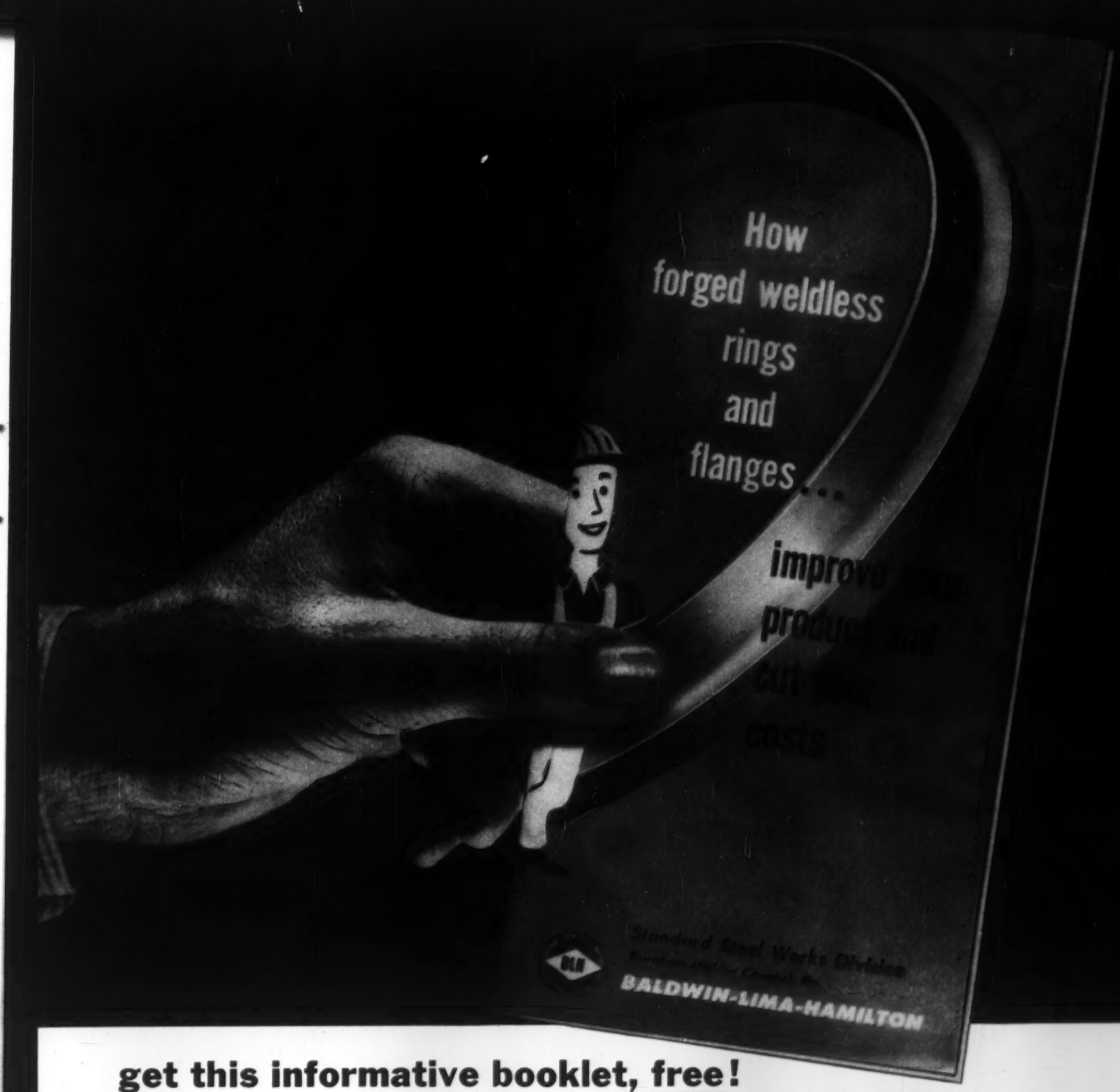
Peerless Gear & Machine Co., manufacturer of gears, speed reducers and die-cast pinions and racks, moved its plant to Dunkirk, O. The 16,000-sq-ft plant provides 20 per cent more space and enables the company to consolidate operations formerly carried on in plants in Toledo and Trilby, O.

General Scientific Equipment Co. moved to enlarged quarters at 7516 Limekiln Pike, Philadelphia 50, Pa. The firm specializes in industrial safety equipment.

Lead Industries Association moved to 60 E. 42nd St., New York 17, N. Y.

Chicago district sales office of **Bohn Aluminum & Brass Co.** has been moved to 6631 Stanley, Berwyn, Ill.

International Rustproof Corp. moved to larger quarters at 1575 Merwin Ave., Cleveland 13, O. The firm makes rust preventives and corrosion solvents.



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AVAILABLE FOR IMMEDIATE POSSESSION AND PRODUCTION

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OTHER HEAVY DUTY USES

- Ceiling heights up to 25' under hooks
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Technical Outlook

5000°F FURNACE— Need a furnace for ultra-high temperature work? Harper Electric Furnace Corp., Buffalo, is making graphite tubular element furnaces in which temperatures as high as 5000°F can be maintained indefinitely. Tubes have inside diameters up to 6 in. Featuring continuous operation, the unit has an automatic mechanical pusher, entrance preheating chamber and water-cooled cooling chamber.

WELDING RUMOR— Look for Linde Air Products Co., New York, to announce a radically improved system of hand welding early next year. Its main feature will be a better method of applying flux to a weld. STEEL's source hints it's good enough to make deep inroads into present methods, possibly replace them.

SLUGGER— Producers of aluminum impact extrusions welcome a new machine that casts slugs. Stroman Furnace Co., Chicago, says its caster starts with ingots, makes them into slugs without scrap. Built-in controls insure a high degree of quality.

PALLET PATTERNS— The Department of Commerce has published six master charts showing 172 pallet patterns for 20,000 sizes of containers on 40 x 48 in. pallets. All patterns rate more than 80 per cent in area efficiency. See "New Books," page 118, for details.

MAGNESIUM MOON— The satellite will be made of magnesium. Brooks & Perkins Inc., Detroit, has been chosen by the Office of Naval Research to devise special methods and techniques required to manufacture the 20-in. sphere which will zoom through outer space at 18,000 mph. Each half will be drawn from a single sheet of 0.020-in. thick magnesium alloy. Many strengthening pieces, battery supports, brackets and attachments for instruments—all of magnesium—are a part of the structure, as are built-in pressure chambers and supports for radio antennas.

BIG BROACH— To keep up with the new road building program, construction equipment builders are using big broaches to speed production. One of the largest, 8.04-in. in diameter by 74 in. long, was completed recently by Ex-Cell-O Corp., Detroit. It splines a 4.75-in. steel piece in one pass. To insure uniform hardness, Ex-Cell-O bored a 3½-in. hole lengthwise in the broach before heat treatment.

CHAIN CHATTER— Engineers at Chain Belt Co., Milwaukee, offer these maintenance tips for roller chains: Don't couple a new section of chain into a worn strand. It's O.K. to substitute individual links. Make sure sprockets aren't eccentric and that teeth fit the chain.

SAVES MACHINING TIME— Unit Crane & Shovel Corp., Milwaukee, is saving 2.5 man-hours in the manufacture of each vertical traction shaft it makes from seamless steel tubing. A center boring operation is eliminated.

IRRADIATED PLASTIC— Parts molded from irradiated, carbon-black filled polyethylene retain a tensile strength of 500 psi at 300°F, say engineers at General Electric Co.'s Chemical Development Department, Pittsfield, Mass. Known as Vulkene 107-E, the material has a yield strength double that of conventional polyethylene. Creep deformation is about 10 per cent that of polyethylene.

The operator examines a foot long rod sample. Ultraviolet lamps (above) cause fluorescent iron oxide paste to glow, pointing up the defects

Faster Inspection in a Rod Mill

There wasn't enough time to etch rod samples. Here is how one mill cut its inspection time in half with magnetic inspection, eliminated most of its acid etching equipment

SEMIAUTOMATIC, magnetic inspection speeds up the detection of surface defects in coils of steel rod. A job that used to take 45 minutes is now completed in only a few minutes.

The safety wire immediately in front of the water cascade trips the electrodes. An empty saddle is by-passed

The equipment is installed in the new rod mill at the Cuyahoga Works of the American Steel & Wire Division, U. S. Steel Corp., Cleveland. Its maker (Magnaflux Corp., Chicago) says it is the first of its size in a steel mill. It eliminates the need for acid etching test equipment.

Need Speed—The division's new conveyor line travels about 60 ft a minute. It carries a coil of rod from the rod mill (nearly a third of a mile away). The trip through the inspection department to the loading dock takes only 25 minutes.

Acid etching requires about 45 minutes. By the time a defect could be identified, the offending coil had been loaded. Remedial action wasted much valuable time and effort.

With the new system, defective coils are identified before they reach the loading dock.

Operation—An endless conveyor on the unit carries foot long samples through a water cascade of fluorescent iron oxide particles. Immediately after coating, the rods are magnetized by passing direct current through them. This produces the circular magnetism needed to detect cracks or seams that run lengthwise in the rod.

After magnetizing, the rods continue into a curtained booth. Ultraviolet rays light up the fluorescent particles that are concentrated around the defects. Longitudinal cracks or seams show up clearly as long, thin lines.

An inspector marks each defect with crayon, after which it is filed and measured for depth when necessary. Samples which exceed quality specifications are identified and matched to the original coil.

Another Check—The regular upset test is still used to some extent at Cuyahoga Works. Stock destined for less severe upsetting operations may not be tested in the Magnaglo. Critical items are usually tested magnetically. In a few cases, samples are still etched to meet special quality standards.

The Magnaglo unit is enclosed in an air conditioned room with etching facilities, workbench and desk. The conveyor extends through one wall and is loaded by hand from the inspection area outside the testing room.

production ideas
NO. 4 OF A SERIES

Doing More with Short Run Dies

Better materials and techniques make it possible for you to produce more parts with them. On medium runs, they can compete with permanent dies

COST-CONSCIOUS stampers are finding a place for short run dies on mass production lines. Here's why:

- They cost 25 to 50 per cent less than permanent dies.
- It takes less time to make them. Chrysler Corp., Detroit, turned out a plastic forming die in three weeks. The permanent die took 20.
- For medium runs (say 100,000), several of them may be cheaper than a single permanent die.
- You can use them to fill in when permanent dies are delayed or break down.
- Diemakers are given an early opportunity to spot stamping troubles. Corrections are incorporated into the permanent tool.
- With parts made on prototype dies, workmen learn the assembly of new models before permanent tools hit the line.

Favorites—Plastics, cast metals, steel rule dies, template dies and upcomers like plastic capped metals are the most popular materials.

Planemakers such as Douglas, Martin, Chance Vought and Boeing have always been strong for short run ideas.

Auto men are catching on. "Short run stamping is an essential part of our production," says John Koons, special staff assistant, corporate manufacturing staff, Chrysler Corp., Detroit. Ford Motor Co., Detroit, says it is doing a lot of research on "the use of plastic and Kirksite dies for high and medium volume runs."

Machinery—Short run techniques will produce satisfactorily on existing equipment. Stretch formers, rolls, hydroformers and presses all work well.

Aircraft firms like the drop hammer and hydraulic press. Douglas, for example, uses Cecostamp and conventional rope drop hammers.

Douglas uses the Wheelon method to form most of its aluminum parts. Only a male die is needed. Douglas says parts are closer to tolerance than those made by the Guerin process.

Chrysler likes the hydraulic press, says the drop hammer is better for aluminum parts.

The chances are good that you can make use of short run techniques in your plant. Here are some of the major points to consider.

Steel Rule Dies

If you're plagued by close lead time and not enough manpower, steel rule diemakers offer these solutions:

- Intricate blanking dies can be made in less than three days.
- Costs may be as little as 10 per cent of conventional dies.
- Die life can exceed 100,000 pieces.
- The system will do a limited amount of forming on light gage sheets. Dimples, louvres and shallow embossments are practicable.
- Almost any material can be blanked. Limits: ½-in. mild steel.

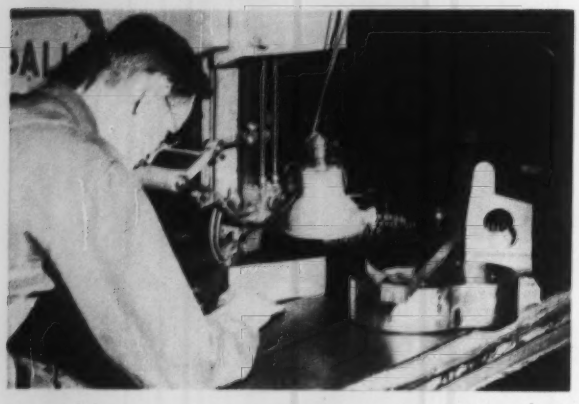
Experimental Use—This type die (sometimes called a dinking die) is just right for the light manufacturer who is unsure of a new line. He can blank enough parts to test the market, invest later in permanent dies.

The development of a blank for complicated forming is expensive when a number of changes are necessary. Several steel rule dies can be made for a fraction of the cost of one permanent die.

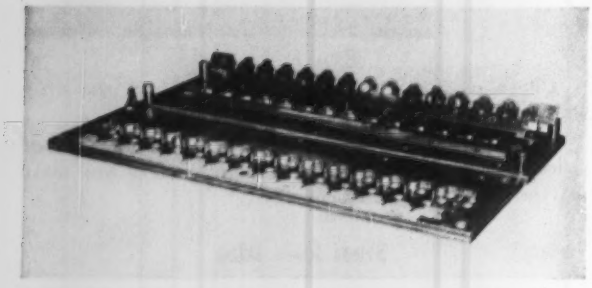
Take the die in the photograph (page 82). The finished part required exceptionally complex forming. The market looked good, but it was so unpredictable that high die cost couldn't be justified.

The Accurate Steel Rule Die Mfrs., New York, made the blanking die. It is used in a standard die set in a mechanical press. Metal thickness determines the tonnage.

Templet Industries Inc., New York, has patented what it describes as a modification of the steel rule die. Said to be more durable than the traditional



A careful saw operator can produce a remarkably smooth finish. Examples on the table will need little finishing



Complexity is no obstacle in making template dies. Stripper is at the top (less springs), blank rests on shoe at the bottom

Operator is shown removing a flexible pattern from plaster master. The pattern, laid flat, indicates displacement waves, determines shape of preform die

type, it has franchised a number of important concerns, among them General Motors Corp., Detroit. Westinghouse Electric Corp., Pittsburgh, and A. O. Smith Corp., Milwaukee.

Magnetic Dies

Although not strictly limited to short runs, Magnetic (tradename) perforating dies must be included because the system is flexible and less expensive than permanent dies for some applications. Press down time represents a fairly minor cost, according to the diemaker, S. B. Whistler & Sons, Buffalo. Punches, strippers, bushings and retainers are standard and interchangeable—the only noninterchangeable parts are two identical templates for each blank, one for the top die half, the other for the bottom.

Magnetic dies will handle mild steel sheet up to ¼-in. thick. The variety of units—round, oval, square and special shape dies, plus custom and standard notches—can be combined to produce quite complicated blanks.

Whistler says that its system can:

- Reduce costs. Punches and die sets are used over and over. Only two templates are needed for each part. A farm equipment maker reported savings of $200,000 from a $45,000 investment in Magnetic dies.
- Save press down time. It takes between 10 and 20 minutes to change from one part to another.
- Cut die storage space. The two templates needed for duplication of setup can be stored on edge. Punches, dies, strippers, etc., will fit all templates interchangeably.
- Speed up model changes. The farm equipment maker says it sliced three months from the time needed for part modification.

Descriptive—The die system gets its name from the Alnico magnets in the base of the punch and bushing retainers. Some of the larger ones exert a 90-lb pull to maintain perfect alignment.

Before a press can use Magnetic dies, it must be adapted with a matched die set, complete with leader pins. On the mating face of each shoe are four tapped locating pins, one at each corner. They are used to fasten and locate the matched templates —one pair is needed for each blank.

Each pair of templates is prepared in the usual way by bluing, scribing and jig boring holes in the desired pattern. Punches and strippers are mounted and secured to one of the templates, bushings and retainers to the other. Templates are fastened to the die set locating pins by thumbscrews.

Plastic Dies

Among plastics, the epoxy family holds the greatest promise, according to many engineers. Epoxy dies, which may be cast or laminated, are used for developmental work as well as production.

They have one drawback: Cast die size is limited by the heat generated by the chemical hardener. A late development modifies the epoxy with a polyamide resin. The combination has been winning a lot of attention.

Here are some of the advantages of plastic dies:

1. You can train unskilled help to assist the toolmaker.
2. The only equipment needed is a mixer.
3. Dies are an almost perfect reproduction of the original mold.
4. They are light. Some weigh only 98 lb per cubic foot.
5. Die design is easily modified. By changing the formulation, you alter the characteristics: Hard-

ness for female dies, resiliency for punches.

6. The plastic method is inexpensive. Costs run from 20 to 40 per cent of those for permanent steel dies.

Some people make several sets of dies so they can do a thorough developmental job. Low cost encourages stampers to try out ideas, make frequent model changes.

Life—Rezolin Inc., Los Angeles, says its formulation will produce 50,000 pieces if the draw is mild and radiuses are not too sharp. A more conservative average is 20,000. It might be possible to run 150,000 pieces on several plastic dies before exceeding the price of one permanent die.

Plastic dies will draw any metal that doesn't require forces greater than those needed for 0.125-in. aluminum in the soft condition, 0.061-in. cold-rolled steels and 0.063-in. annealed stainless sheet.

Selection—Whether you use a castable or laminated die depends on the type of service. Castable dies are easier to make, handle well, but are limited under heavy service.

Dies laminated with glass fiber cloth provide considerably more resistance to rough handling. Drop hammer dies are frequently laminated.

Construction—Plastic dies must have a supporting structure—metal weldments or castings are satisfactory. Cast cores for the punch, binder ring and die may be zinc alloy, cast iron, Meehanite or similar ferrous materials.

Plastics are frequently used with metal powder fillers for greater abrasion resistance. The cores of some types use sand and gravel to reduce costs—some need as little as 10 per cent resin as a binder.

The longest runs are being made with plastic faced metal dies. Castings of Kirksite and lead deform after limited production and require reworking. The life of such combinations is greatly extended by an overlay. The punch is faced with a resilient formulation, the female with laminated glass fibers impregnated with resin. When the facings wear out, they are easily stripped and a new facing recast.

Other Points—In most cases, you don't need a lubricant—the plastic surface is nonsticking, which cuts down galling and tearing. Remember, too, that plastics can be stored outdoors.

Preforming

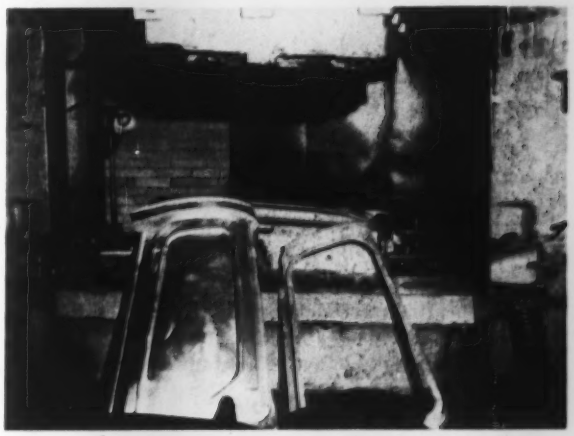
Not all plastic die forming can be done in a single draw. More difficult or complicated parts require several stages, although quite often the judicious use of a single preforming is enough.

Flexible patterns greatly reduce the cost of forming sheet metals. The Clearwater Die & Mfg. Co., Paramount, Calif., uses them to make dies which preform sheet metal blanks for a single finish forming. It eliminates the need for costly staging dies. It is especially advantageous for limited quantities. Flexible patterns for one part saved the company $10,000.

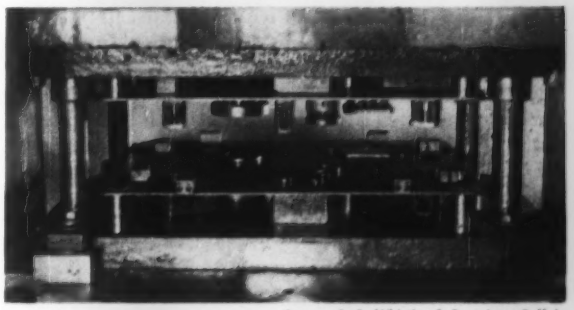
You can use a plaster mockup, prototype, or sand-cast finishing dies for forms simply by lubricating the surface with a wax parting agent. Plaster must be sealed before the wax is applied.

Source: Rezolin Inc., Los Angeles

A plastic die and the experimental auto part it produced. Construction of the die took only six weeks



This drop hammer die is made of Kirksite faced with ¼-in. Epocast plastic (Furance Plastics Inc., Los Angeles). The punch is coated with a resilient formulation. Part is carbon steel

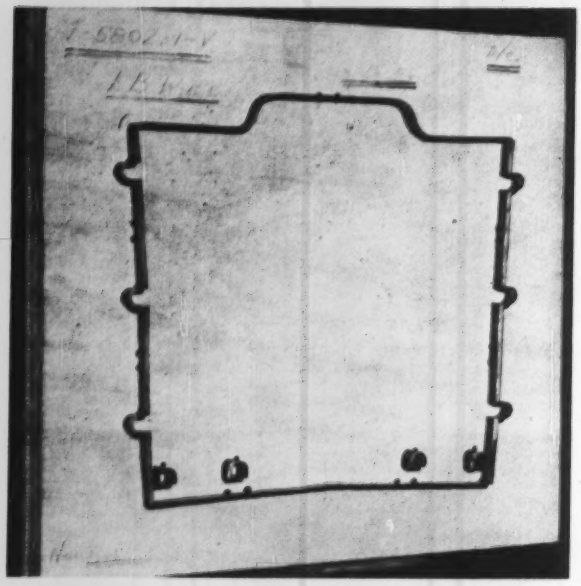


Source: S. B. Whistler & Sons Inc., Buffalo

A Magnetic die set. Templates are attached at four corners to upper and lower die shoe. Magnets in stripper and retainers maintain alignment

Waves—To make the flexible pattern, simply brush on an elastomeric latex. As a rule, about three coats must be applied before the pattern has enough body.

The pattern permits the reproduction of displacement waves on sand-cast preforming tools. The waves represent the location and proper amount of deformation in a blank.



A steel rule die and blank made by it. One maker says its dies will cut mild steel blanks up to ½-in. thick. Rules shown here are inserted in sawed grooves in plywood, backed with steel plate

Wave locations are usually determined by flattening the pattern on a table top, or a surface covered with soft modeling clay. Bulges subsequently appear in the pattern surfaces. These are backed up with modeling clay.

Control—Whether a given bulge is backed up by one large or several small waves depends on the type of sheet metal being formed. Shallow waves are generally preferred for thin materials, since they permit uniform elongation and minimize edge wrinkling. A bead may be added to the edges of the pattern to control difficult wrinkles.

Large waves prevent marking and facilitate the forming of relatively thick materials.

After being backed up with clay, the flexible pattern is used as a master in casting a rigid plaster pattern, which is then used to make a sand mold for the first of two metal preforming dies.

The second preforming die is cast on the face of the first tooling cast. Antimonial lead and Kirksite are used.

Plus Features—As a rule, the preforming dies don't require close-tolerance finishing or polishing. Radiuses are relatively large and because loads ordinarily are vertical there is no overlapping by the tools. Quite frequently, absolute bottoming isn't essential.

A typical procedure consists of striking the material twice with rubber on the die beneath the blank, then once with rubber positioned over the stock. The preform is then annealed and finished by three or four blows with a conventional die. Rubber is positioned above the preform. Tolerances of 0.005-in. are possible.

Most of the materials preformed by the Clearwater company have been stainless steels. John Engel, originator of the preforming idea, says the procedure is equally practical for any commercial sheet metal, including titanium sheet stock.

Preforming is more practical where progressive or staging dies are necessary rather than simple hammer forming with finishing dies.

Substitute—Various combinations of rubber pads and finishing dies have been used to save the cost of staging dies. Excessive sheet stock breakage have run costs over those of preforming tools.

Preforming could lead to simplified assembly. One relatively intricate stamping often can do the work of two or more simple parts.

Preforming improves the quality of hammer-formed sheet metal parts because it minimizes the elongation of finished stampings.

Template Dies

These widely used tools, sometimes called plate-type blanking dies, have a good reputation.

One method consists of sawing a steel plate into a punch and die and filing the two parts to mate properly. These dies will run 30,000 parts without resharpening. Costs are from one-third to one-half less than standard, close-tolerance dies. Die life seldom exceeds 100,000 parts.

The metal cutting band saw has a number of modifications which assist in the production of template dies. The DoAll Co., Des Plaines, Ill., lists these: 1. Attached buttwelders for joining the blade through a hole in the die blank. 2. Hydraulically powered tables that permit long, straight cuts without an operator. 3. File bands. 4. Line-grind bands which cut hardened dies.

Accurate—A skilled saw operator can cut a template die close enough to leave half a scribed line showing. Plate thicknesses for template dies vary according to the thickness of the blank—the heavier the blank, the thicker the template material.

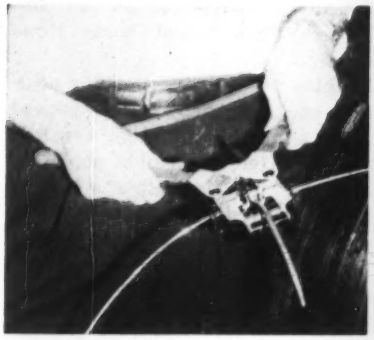
If you plan to use this method, expect finished blanks to have tolerances of 0.010 to 0.015 in. Unusual care and workmanship are needed for a tolerance of plus or minus 0.005 in.

For exceptionally small runs, you can tackweld or bolt sheets or plates into a sandwich and saw the parts all at once. Some medium-heavy manufacturers use a similar method with a welder's cutting torch—stack burning. With careful adjustment of the torch, fairly thin plates will not be welded together, can be separated easily.

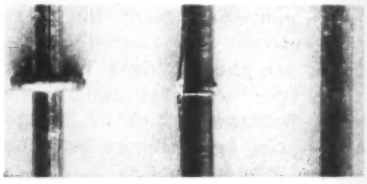
And don't forget the Oxygraph; many mills and warehouses will supply precut blanks to your specifications.

In considering the short run techniques for your plant, don't overlook the Small Lot Stamping Institute, Cleveland, as a source of information. G. C. Wick, secretary of the institute, says that there are about 50 firms in the U. S. devoted exclusively to short production runs.

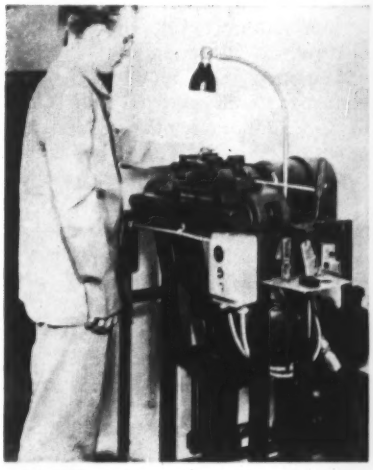
• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



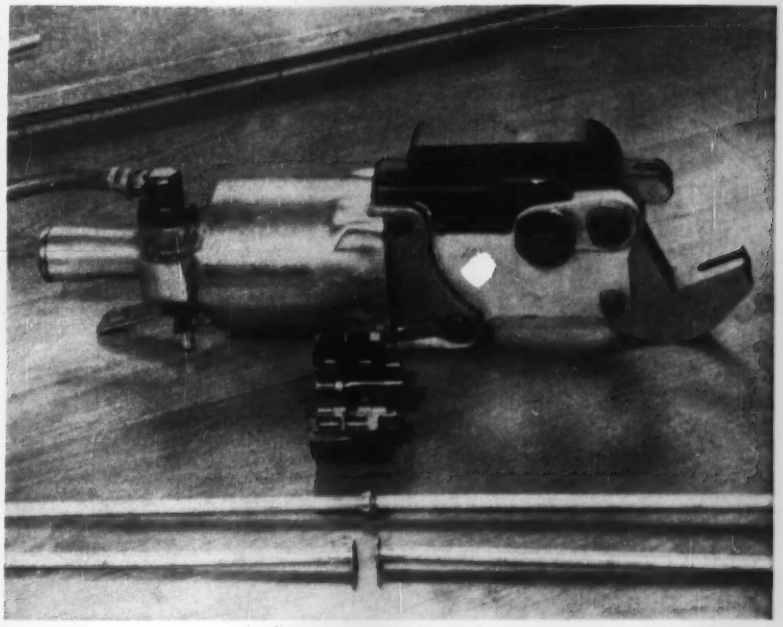
Operator uses plierlike, hand welding tool to join aluminum wire



Pressure welded joints show flash and necked down section



Hydraulically operated buttwelding machine handles rod up to 7/16-in.



Air-operated machine. Unit takes flanged tubes (bottom of photo), welds them as shown. Die (center) fits on right end of machine

Welds Without Heat

Cold-welding tools use only pressure to join aluminum and copper tubing, strip and wire. Joint tensile strengths obtained are equal to those of the parent metals

SCRAPPING hard drawn aluminum wire can be expensive. General Cable Corp., St. Louis, joins short pieces into usable lengths by cold welding.

Two freshly cut metallic surfaces are pressed together with sufficient pressure to cause plastic flow and a molecular bond.

Uses—The refrigeration industry uses aluminum tubing with a copper end. Pressure welding tools join the two metals without porosity or the brittle intermetallic compound that would result from heating.

In some installations, heat can't be tolerated, as in underground servicing where gas may be present. Cold welding is the answer for applications where parts are insulated or where heat will have a harmful effect on the materials.

Properties — Copper, aluminum and other nonferrous metals can be pressure welded. Research at Kaiser Aluminum & Chemical Corp., Spokane, Wash., indicates cold-welded joints have good tensile and impact strength. Electrical resistances measured across aluminum-to-aluminum weldments differed little from those measured across comparable sections of parent metal.

In tensile tests at Aluminum Co. of America, New Kensington, Pa., all aluminum-to-aluminum specimens broke outside the weld zone.

Tools—Utica Drop Forge & Tool Corp., Utica, N. Y., makes Koldweld tools (manual and power) for joining tubing, strip and rod.

These tools clean the metal and square it before clamping. A good bond calls for cleaning. Before lapwelding, surfaces are cleaned by a wire brush.

Eight conveyors carry the workload at Michigan Wheel Co.

Conveyors Boost Foundry Output

Eight roller conveyors carry molds from molding machines to pouring area to shakeout at a Michigan foundry that casts replacement propellers for outboard motors

CONVEYORS have increased production 30 per cent and cut labor costs in half at Michigan Wheel Co., Grand Rapids, Mich.

The foundry casts aluminum and bronze propellers for outboard motors. Before conveyors were installed, the company used a turntable of the merry-go-round type. Completed molds were placed on the turntable for pouring, then taken off for shakeout.

Now — Eight molders work at the sand hoppers, one on each of the long conveyor lines. The molder puts his finished mold on an asbestos board placed on the conveyor. Each board holds three molds.

Molds are rolled to pouring position on the conveyor and poured when a number of them accumulate. After the molds cool, the conveyor line is pulled sideways on its grooved caster wheels which run on angle iron tracks.

Conveyors — The molds are dumped on convenient shakeout tables, and the empty mold racks are stacked on the stationary conveyor section and rolled back to the molder.

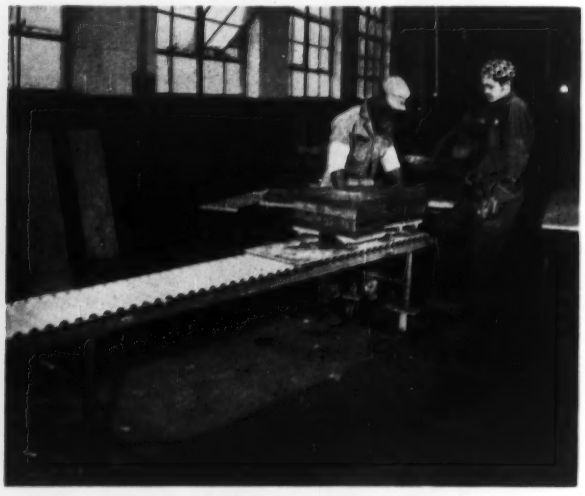
The conveyors, made by Metzgar Conveyor Co., Grand Rapids, Mich., are the labyrinth ballrace, roller type, with five rollers per foot. Rollers are 2 in. by 8 gage Armco zinc-grip tubing; bearings are on 5/16-in. shafts.

Continuous—Working with the eight molders are four handlers and two pourers. Six gas-fired furnaces supply the metal. Gates are cut off in an adjoining room and melted with new pig. Castings are rough snagged and taken to the foundry's other plant for finishing.

The foundry is at peak production. Employing 26 men, it is barely able to keep up with orders. In previous seasons, it never was able to meet demand with twice as many men.

Four or six molders can work as efficiently as eight on a shift. The old merry-go-round mold carrier is used only for short runs or specials.

Molders work at two of four conveyor lines



Shakeout table at end of conveyor line

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Enclosed brick saw. A foot pedal lowers the saw on the brick. The worktable, which is mounted on rollers, is fed manually with a push bar that extends through the shatterproof glass doors

Treatment Eliminates Silica Dust

Timken Roller Bearing Co. treats all silica brick for its electric arc furnaces with an ammonium lignosulphonate solution. Cutting is done with an enclosed saw

SILICA brick is used extensively in electric arc and open-hearth furnace construction. The silica dust it gives off during handling can cause silicosis if it is inhaled.

Timken Roller Bearing Co., Canton, O., has eliminated the major source of this dust by doing away with hand cutting. The company uses preshaped brick; when cutting is necessary, it is done with an enclosed, vented saw.

Handling—This doesn't eliminate the dust created in unloading, stacking and laying up the brick. To bind the loose particles to the surface of the bricks during handling, Timken treats them with a solution of Orzan A, an ammonium lignosulphonate.

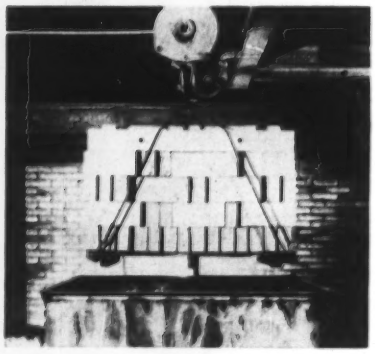
Made by Crown Zellerback Corp., North Portland, Oreg., the solution is easily applied by dipping or spraying. It dries rapidly to form a resinous coating.

Dipped—The dipping setup at Timken makes it possible to treat full pallets of silica brick without restacking or special handling.

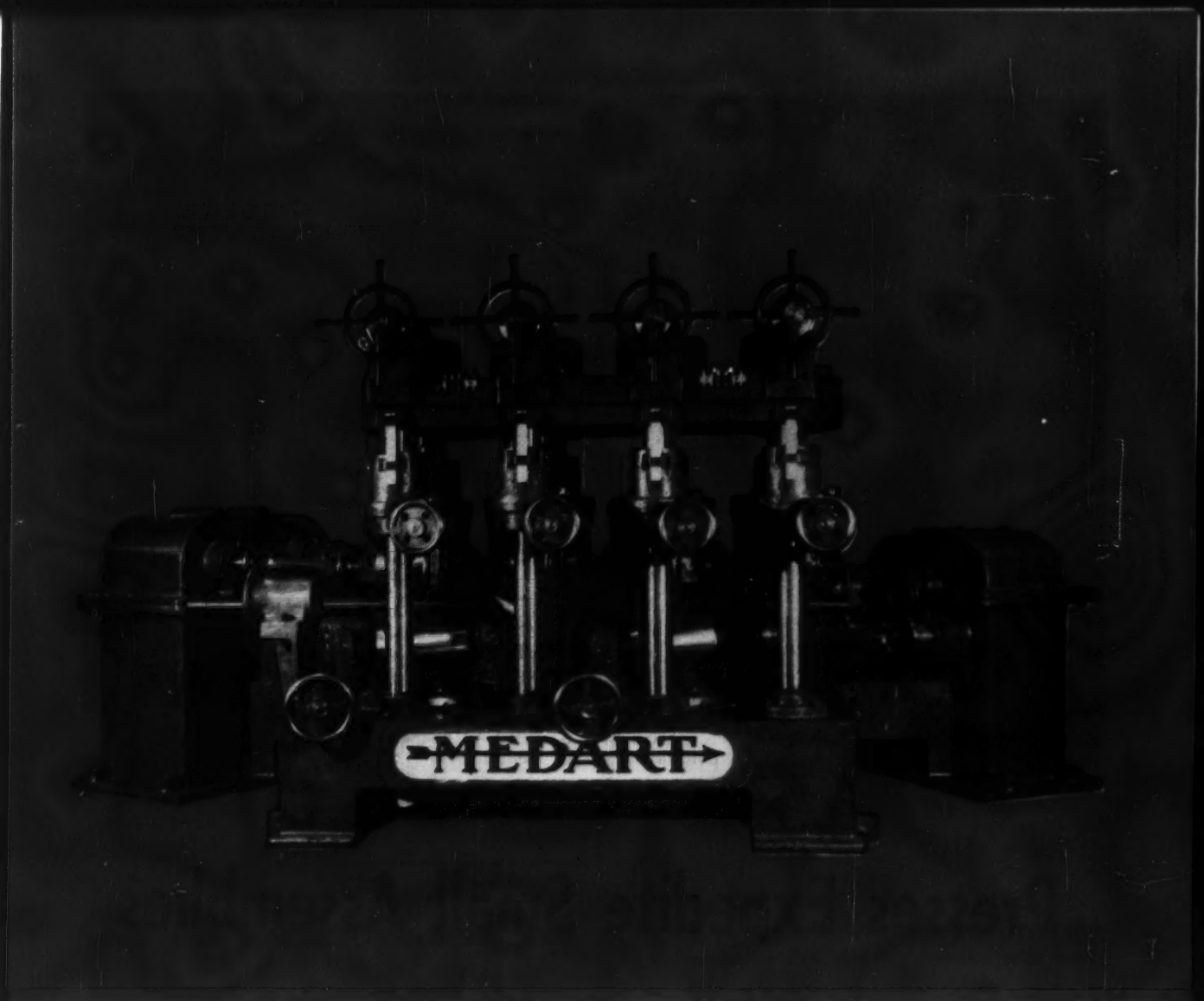
The lignosulphonate solution is prepared by simply adding the powder to the water (1 lb per gallon) and mixing with air agitation. An antifoam agent is added to kill the foam blanket that forms during mixing.

No Harm — Bricks so treated have been used in the construction of more than 50 electric furnace roofs at Timken. Bricklayers report there is no dust; service records of the roofs show that the treatment has not been detrimental to roof life.

The immersion technique used at Timken consumes more of the solution than necessary. A surface penetration of only a fraction of that gained in dipping would be effective in inhibiting dust formation, says C. E. Cline, superintendent of the masonry department. He adds, "A spray application of the solution to the refractory by the manufacturer would be more efficient and should be beneficial to both manufacturers and consumers of silica refractories."



A pallet of bricks can be treated without restacking or special handling. The solution penetrates the surface of the brick and dries to form a resinous coating that binds loose particles



BLAW-KNOX MEDART makes what it takes

for high speed, Multiroll Tube straightening

Developed to meet the requirements of pipe and tube mills, the Blaw-Knox Medart Multicycle Rotary Straightener delivers high speed precision straightening of pipe and tubular products. It differs from other six roll machines in that the sixth roll is also a straightening or bending roll. In conjunction with the middle bending roll, it imposes a duplex straightening cycle on the workpiece.

Unbalanced torque on the workpiece is eliminated since all four feed rolls are driven from a single motor. This insures positive, synchronized feed and torque balance. What's more, this application of balanced torque permits thin wall tubular straightening not possible with other types of machines. Delivery speed is limited only by the condition and properties of the workpiece which may limit the torque and pressure applied.

The Blaw-Knox Medart Multicycle Rotary Straightener is available in all sizes for handling materials in diameters ranging from ¼" to 18". Larger sizes will be designed upon request.

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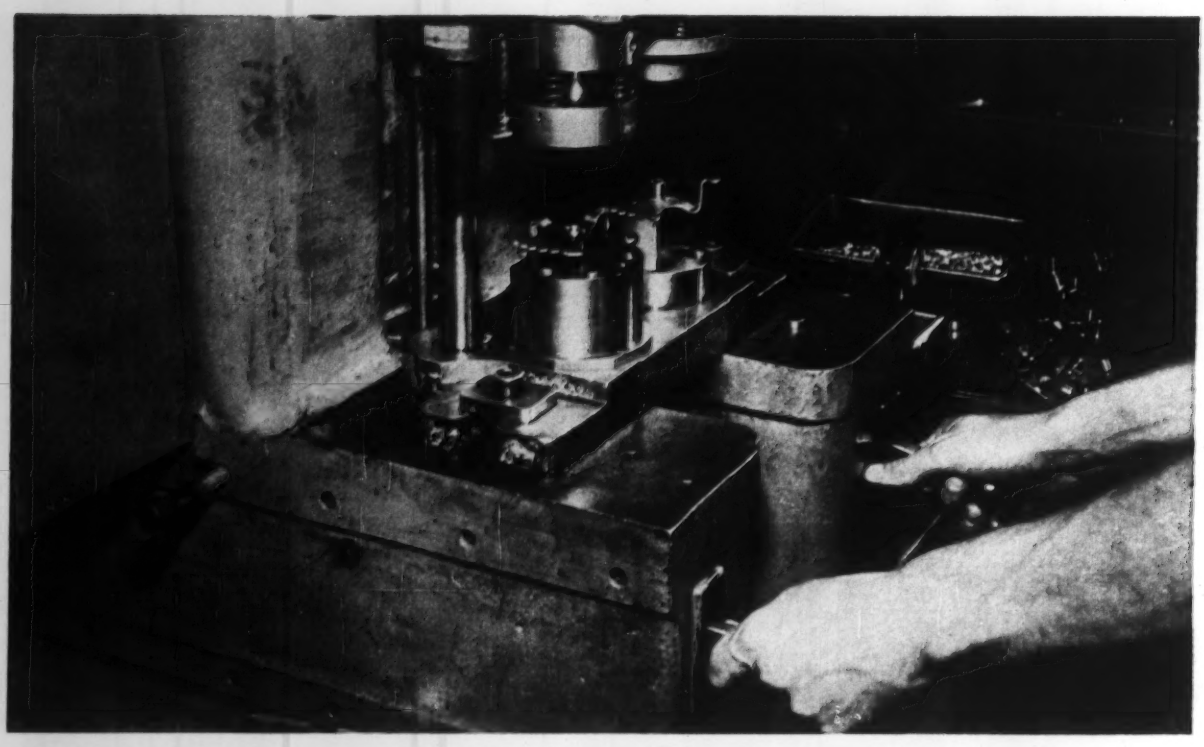


Stamped valve lever with a serrated hole is pressed over a shaft and (in position at operator's right) is staked for positive fastening. Production is more than 1000 assemblies in an hour

Presses Expedite Small Assemblies

PRECISE, safe and fast assembly operations on automatic transmission components are done with marked economy by small hydraulic presses at the Indianapolis plant of Chrysler Corp.

Tooling ingenuity has been teamed with the presses to make for savings without a sacrifice in quality.

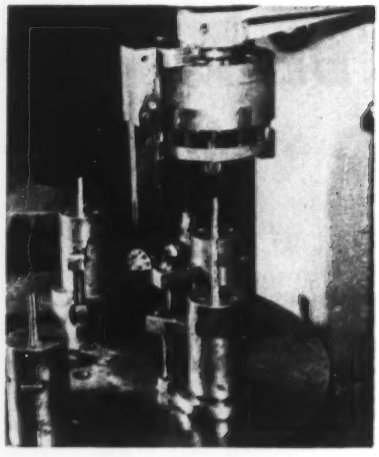
Double Duty—In one setup, a 6-ton Denison Multipress is equipped with a two place fixture and punch that presses a stamped valve lever over the hub of a short shaft. This is done in the left portion of the fixture. In the second position, at the right, the punch stakes the lever securely to the shaft.

The left-hand station is reloaded before the press closes each time. So the press does two separate operations on each working stroke. It enables one operator and a single press to do the same jobs formerly done by two men and two presses. One man now turns out over 1000 assemblies an hour.

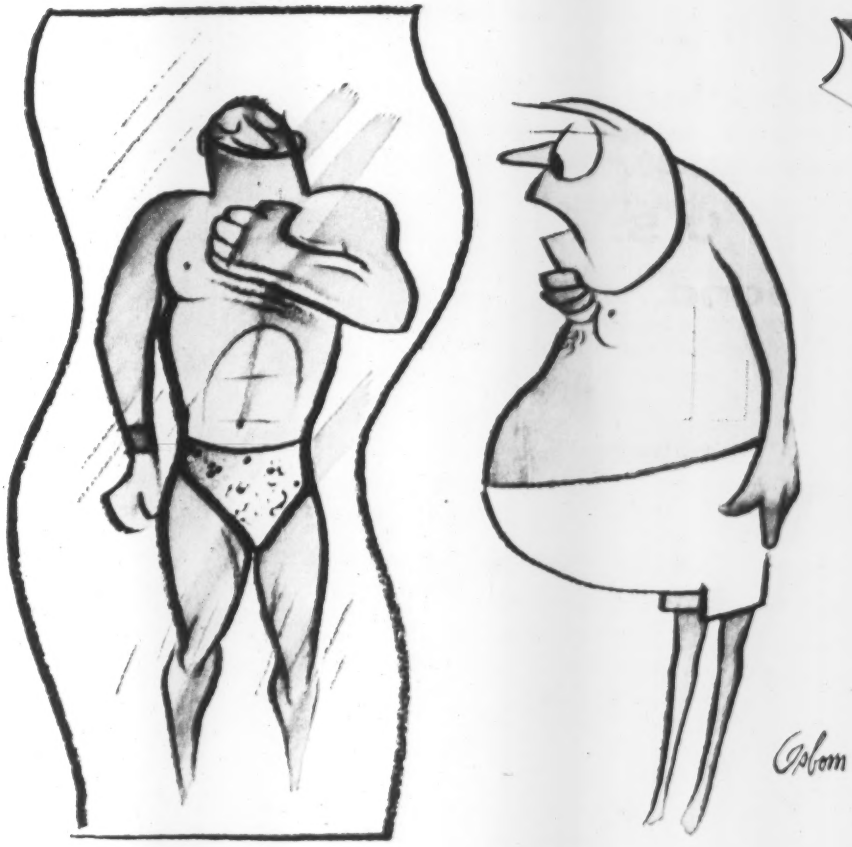
Form Fit—When the stamping is made, the hole for the shaft is serrated by the punch. The inside diameter of the serrations is smaller than that of the hub, which is cylindrical and not serrated. The stamping cuts its own serrations on the hub.

Staking provides a still tighter fastening of the stamping to the shaft. It also helps to keep the stamped lever square with the shaft and within the close location limits set.

Although the staking punch is subject to some wear, it can be resharpened easily and can pro-



Six fixtures on the dial table hold speedometer shafts, with the drilled hole up. As the punch enters the hole, a cam forces four die blocks against the shaft, forming the square



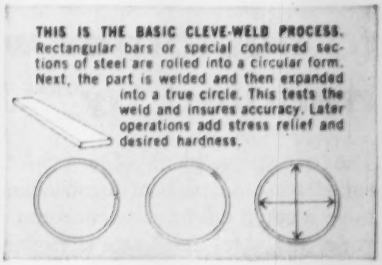
DISTORTION

in circular parts means costly hold-ups on your production lines. End this downtime with metallurgically accurate Cleve-Weld welded parts.

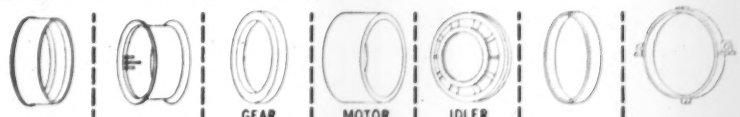
Cleve-Weld Process insures accuracy in circular parts

Cleve-Weld can meet exacting specifications, like those for jet engine rings, because it has the *knowledge, experience* and *facilities.* Modern equipment like oil-quench and hydraulic presses, and under- and over-fired gas furnaces help Cleve-Weld prevent distortion and insure metallurgical accuracy in circular parts.

Put Cleve-Weld's 45 years of *design, metallurgical and production experience* to work to cut your costs. See for yourself how the Cleve-Weld Process can give you accuracy while it *cuts your costs three ways compared to bulky cast or forged parts.* Write or send drawings to Circular Welded Products Sales Department.


THIS IS THE BASIC CLEVE-WELD PROCESS. Rectangular bars or special contoured sections of steel are rolled into a circular form. Next, the part is welded and then expanded into a true circle. This tests the weld and insures accuracy. Later operations add stress relief and desired hardness.

EXAMPLES OF CLEVE-WELD PROCESS PRODUCTS



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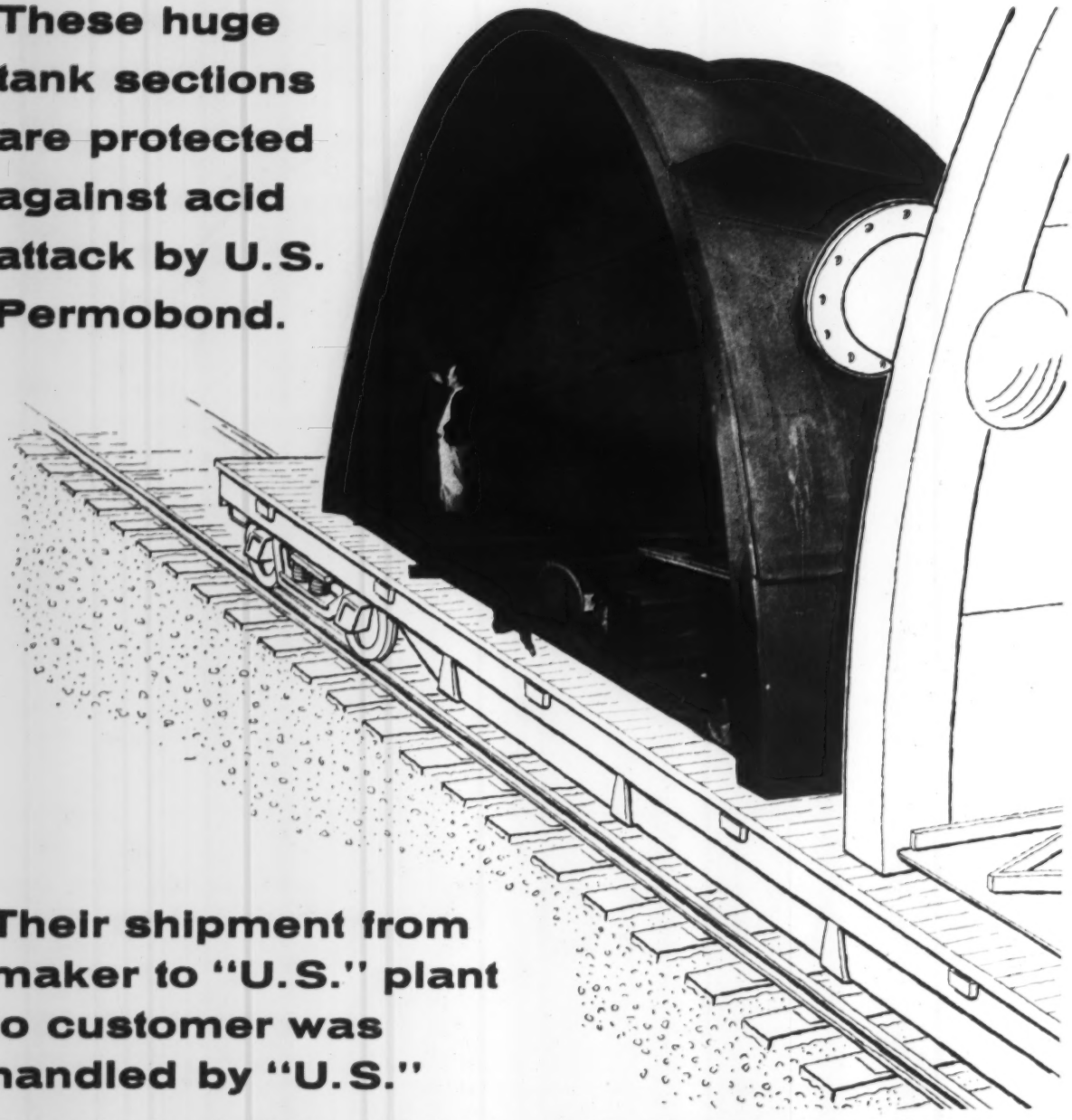
These huge tank sections are protected against acid attack by U.S. Permobond.



Their shipment from maker to "U.S." plant to customer was handled by "U.S."

The expansion plans of a Southern chemical plant called for the design of a processing tank that was so huge it could not be shipped in one piece.

So the steel fabricator's engineers, working with "U.S." engineers, designed the tank in 2 parts. The tricky task of transporting these immense sections from the fabricator to the "U.S." plant (where U.S. Permobond protective linings were installed) and from there to the chemical plant was *arranged* by "U.S." traffic specialists. When the 2 sections arrived at the chemical plant, "U.S." field service men vulcanized the joints after the halves were welded together, making a complete rubber lining with no seams or joints. Thanks to the Permobond® lining, the tank is immune to acid attack.

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duce fully 50,000 parts before it is worn out.

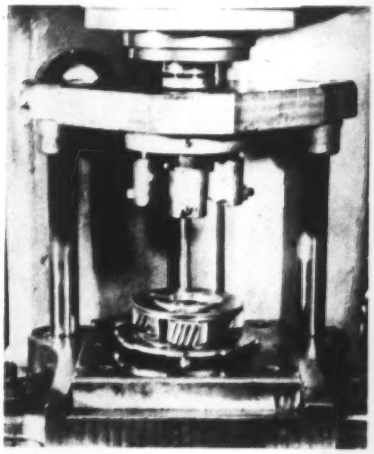
Side Formed—The speedometer shafts, produced on a screw machine, have a drilled hole in the end. They need a formed square in this hole to mate with the external square fitting on the end of a flexible cable.

To form this square within a tolerance of only 0.003-in., a square, carbide faced punch is used. This punch, carried in the ram of the Denison 8-ton press, enters the hole of each shaft when it is indexed to the ram position on the six station index table. After the punch enters the hole, a cam (also carried on the press ram) engages a cross slide of the holding fixture and forces the slide inward.

As it moves in, it forces die blocks on all four sides against the thin wall of the drilled shaft, deforming the wall and causing four flats to be formed in contact with the punch.

When the fixture moves to the next station, the shaft is released and a light spring pushes the shaft up so it can be removed by hand. Fixtures are reloaded by hand, two at a time, at front stations. Indexing is automatic and synchronized with the press ram.

With this setup, squared holes are turned out at the rate of 5000 in 8 hours.



In a third setup, shafts (held in upper fixture by spring-loaded balls) are pressed in the holes of three planetary pinions. At the same time, they force out the dummy pins temporarily holding the pinions

Machine Tool Users Sound Off

Equipment replacement, they say, is being held up by new machines that don't fully answer their needs or wants. They ask for higher speeds, one-shot lubrication

SOME machine tool users don't always get what they want in the way of improvements and new machine developments.

That's the conclusion to be drawn from what a forum on equipment replacement said at a meeting of the National Screw Machine Products Association in Milwaukee.

Asked if lack of money was the big factor holding them back on equipment replacement, more than half replied, "No." They said: "The big reason is that manufacturers have not provided the type of equipment we feel is necessary to invest our money in."

Wants—Reporting on the meeting, Philip A. Scheuble, administrative assistant to the vice president-manufacturing, A. O. Smith Corp., Milwaukee, says the question boils down to this: Do improvements coincide with what the users want?

Here are features these users of multiple-spindle automatics are looking for:

Higher speeds, feeds and horsepower are their first wants. Mr. Scheuble feels the needs are recognized by equipment makers, as proved at last year's Chicago show. But, he adds, the trend has not progressed with equal speed when all machine types are considered.

Ease of setup is a must. The big reason is that skilled personnel often can't be left on one job. Users ask that versatility be built into the equipment "so we can transfer the skill to the equipment and not to the operator."

Interchangeability of parts, toolholders, etc., is admittedly a problem, but users believe this flexibility will help them to cut costs. They agree part of the responsibility rests with them.

Lubrication should be simplified. They like one-shot systems.

Coolants should be water soluble oils for two reasons. First, because they provide good cooling, they will speed the switch to carbides and higher cutting speeds. Second, they'll help eliminate mist, the scourge of the machine shop.

Accessibility of working parts for easier maintenance and repair was their final point.

Who's at Fault?

Part of the answer lies in better market research by machine tool builders. Several newly developed machines were completely checked out with prospective users before design was frozen. Another builder designed and built a small press almost solely on the information supplied by a comprehensive survey he conducted among potential customers.

Only part of the responsibility lies with the builder. Mr. Schueble, in his remarks on interchangeability of tools and parts, says: "Technical societies and groups like this can do a lot to stimulate that type of thinking." He's probably right. User groups can aid builders by indicating what they want and would be willing to pay for. It would help rule out individual requests for special features, and tell builders what a large number of users consider desirable.

Price Angle — Some builders point out the conflict between what's wanted on the machine and the price the market will bear. Redesign for higher speeds, feeds and horsepower, for example, takes tougher gear trains, more beef in the machine and costlier materials, better clutches and other components. It can't be done for nothing, and it's hard to add to the price when competition is rough.

step by step...
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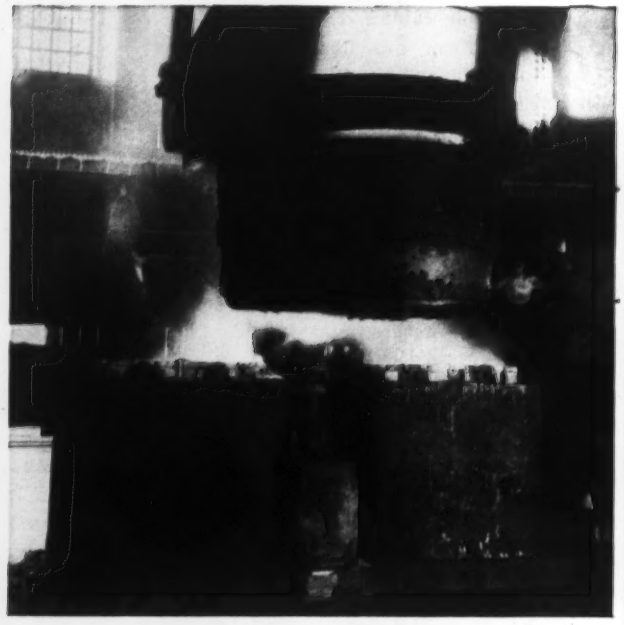
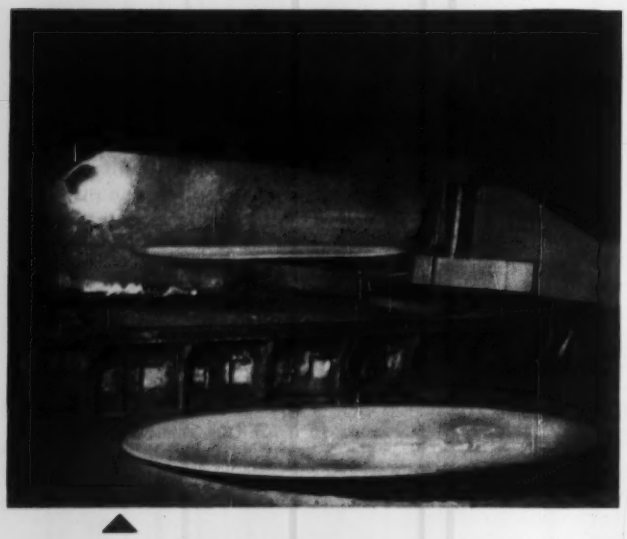
Our customers have been telling us for years that Claymont Flanged and Dished Heads successfully meet every requirement for top quality. The reason behind such high performance is that we build quality into every head throughout every stage of production—from raw materials to finished product. Here's how:



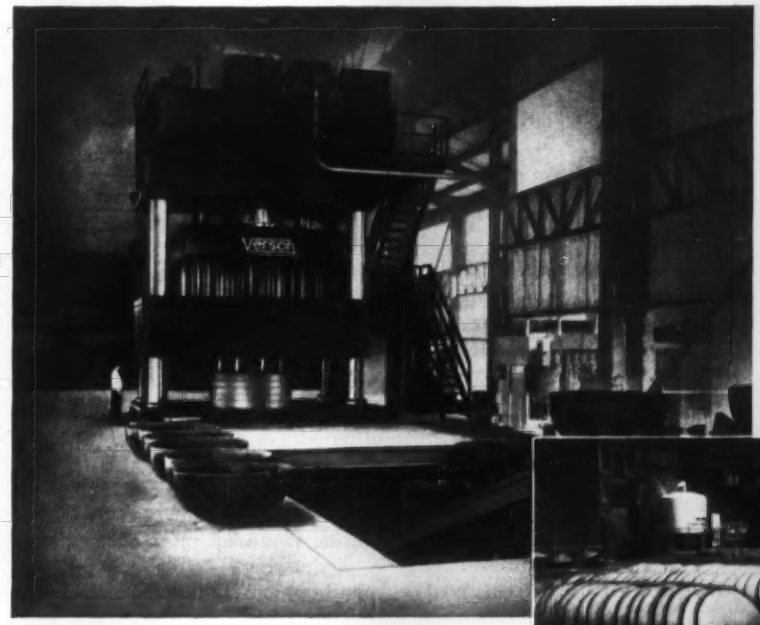
Because we make our own steel, we can carefully control its chemical and physical properties. Here, steel is being "bottom-poured". This means that the ingot mold is filled from the bottom, thus assuring a more uniform steel.



After rolling the ingots into plate, steel circles are sheared to exact size and then heated in huge furnaces like this to the proper temperature for spinning.

This highly skilled craftsman is operating a big spinning machine which produces heads up to 19 feet in diameter. Every head he makes is subjected to careful inspections, both during and after forming.

ITS FLANGED AND DISHED HEADS



Claymont's head pressing facilities include this new 3000-ton giant, capable of hot or cold forming large diameter heads up to 10 feet. With this modern equipment, Claymont can press steel heads that will meet your most exacting specifications.

Stock Heads—You can be sure of quick delivery when you order from Claymont. That's because CF&I maintains large stocks of popular size heads, as well as many types of fittings for tanks and pressure vessels, at these warehouses: Los Angeles, Tulsa, Houston, New Orleans, Chicago, Buffalo and Claymont, Delaware.

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Like our heads, all Claymont products have quality built in—by just such painstaking controls and tests during every step of manufacture. For complete information on any Claymont product, contact our nearest sales office or write direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

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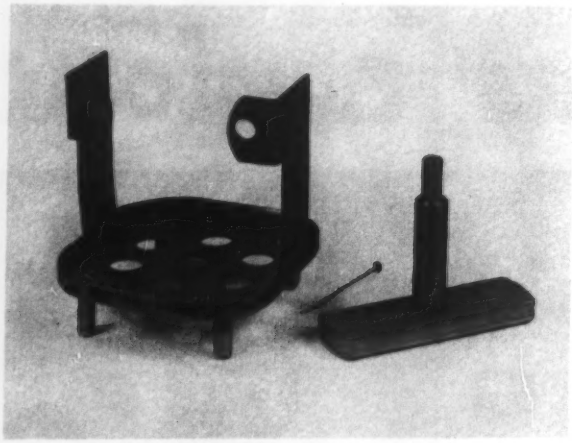
No. 6, Part I, in STEEL's Modern Brazing Series

Stainless cutoff valve assembly (AMS 5632) copper brazed in dissociated ammonia in pusher-type furnace with Inconel muffle. Two-piece construction facilitates machining



Mild-steel stamping with four 302 stainless studs (left) and type 440 stud with 302 base (right) copper brazed in dissociated ammonia in hump mesh-belt furnace

How To Braze Stainless

Constituents like silicon, titanium and aluminum make stainless steels difficult to braze. Here are techniques that will bring these troublesome elements into line

By H. M. WEBBER
Industrial Heating Department
General Electric Co.
Shelbyville, Ind.

STAINLESS, heat resisting and superalloy steels contain a long list of elements. Their percentages and their oxides determine whether it will be easy or difficult to braze by recognized techniques.

Iron, nickel, chromium, manganese, tungsten, molybdenum, cobalt and copper cause little or no difficulty. Silicon, titanium and aluminum are troublesome.

Reducible—Chromium oxide can be a troublemaker under improper conditions, but is easily reduced with hydrogen. Troublesome elements require hydrogen with a purity that is not commonly feasible.

When such constituents appear in noticeable proportions, special steps may be necessary to assure wetting by the filler metals. It may be better to braze in a vacuum, which in many cases will give superior results.

Filler Metals

Commonly used filler metals consist of a single element, such as copper, eutectic alloys with sharp melting points like 72Ag-28Cu and those with narrow or broad melting ranges. A narrow melting range is typified by 85Ag-15Mn which has a solidus of 1760°F and a liquidus of 1780°F; typical of a broad melting range is AMS 4775 (Cr 17, Ni 70, B 4, Si 4, C 1.00), which has a solidus of 1850°F and a liquidus of 1950°F.

Service Temp—Copper is widely used to braze stainless for room-temperature applications since it provides good strength at low cost, but its strength and oxidation resistance fall off rapidly with increasing temperature. The 85Ag-15Mn alloy is popular for moderately elevated service temperatures—up to about 900°F.

For high-temperature service, other alloys are preferable. AMS 4775 is useful up to 2000°F.

Forms—Copper is available in practically any form—wire, foil, powder-paste, molten-spray and electroplating. The 85Ag-15Mn metal, which is finding its greatest usefulness in brazing honeycomb assemblies, is used as sheet foil.

AMS 4775 and similar nickel-base brazing alloys are used mostly as powder. The most common liquid carrier is an acrylic resin mixed with acetone or carbon tetrachloride. This slurry can be brushed or sprayed on. Sometimes, dry metal powder is applied at the joints and coated with acryloid cement from an eye dropper. Filler metal also can be applied effectively by molten spray from an oxyacetylene gun.

Cleanliness

Excellent results have been obtained in bright brazing stainless assemblies without removing light oil from the base metal, but most users prefer not to take the chance of impairing the bonds with carbon from the oil.

It is general practice to degrease parts before brazing. Trichlorethylene seems to be preferred. Caustic washing with a good rinse or anodic cleaning is approved.

Nonmetallic materials worked into the surfaces of parts in operations prior to brazing can sometimes cause trouble in wetting.

Select lubricants or drawing compounds that do not contain undesirable constituents, particularly sulphur or lead, which could result in brazing difficulties.

Clearances

Joint clearances vary with the assembly. Parts with snug fits often are self-supporting; those fitted loosely may require fixturing or auxiliary supporting.

Flow — Mechanical considerations, such as whether the joints have vertical or horizontal axes, are important in directing the flow of the molten filler metal. Once the filler metal is at the joint, capillary attraction may draw it through.

The thickness of the bond often is directly related to the composition and strength of the solidified filler metal.

Copper—When brazing stainless with copper, it is ideal to have size-to-size fits to 0.001-in. looseness on the diameter; press fits of 0.003-in. to loose fits of 0.003-in. are used successfully.

If fits are extremely tight, the copper may penetrate only about $\frac{1}{8}$-in. into the joint. Under such conditions, one trick is to apply copper-powder paste which contains a small amount of flux at the end of the joint opposite a copper-wire ring. With this, the copper penetrates throughout the joint.

Silver — Silver brazing alloys generally work best with 0.001-0.002-in. gaps or twice this amount of looseness on the diameter.

Nickel—The nickel-base alloys have best room temperature strength with the thinnest possible film of filler metal. Size-to-size fits are best where only shallow penetration of filler metal is needed. Zero clearance is unsuitable for joints of any depth; the result would be incomplete bonds following interalloying and subsequent freezing of the filler metal. For deep penetration, gaps of 0.002-0.004-in. or twice these clearances on the diameter, are in order.

Promote Wetting

Molten filler metal must wet the base metal so capillary attraction can draw it throughout the joints. In many cases, there are no wetting problems, particularly with nickel-chromium-iron base metals.

Surface — As in brazing mild steel, roughened surfaces on stainless give better surface capillary action and spreading of the filler metal. Slight roughness from machining rather than ground finishes, or blasting with fine steel grit or silicon-carbide grit are recommended.

Although bright brazing of stainless implies the use of no flux, it is sometimes necessary to "cheat" a little to obtain best results.

Example: When brazing 17-7 PH stainless, some users mix a tiny amount of sodium-fluoride powder with the brazing alloy powder. When brazing 17-7 PH with 85Ag-15Mn, it is common to brush a thin alcohol solution of noncorrosive flux, such as borax, on each sheet of brazing foil and the mating surfaces of the metal.

Lithium—There is extensive experimental use of lithium-containing silver alloys for brazing stainless without flux. The most promising use: Replacement of silver-manganese in the fabrication of honeycomb structures. The increase in wetting is tremendous.

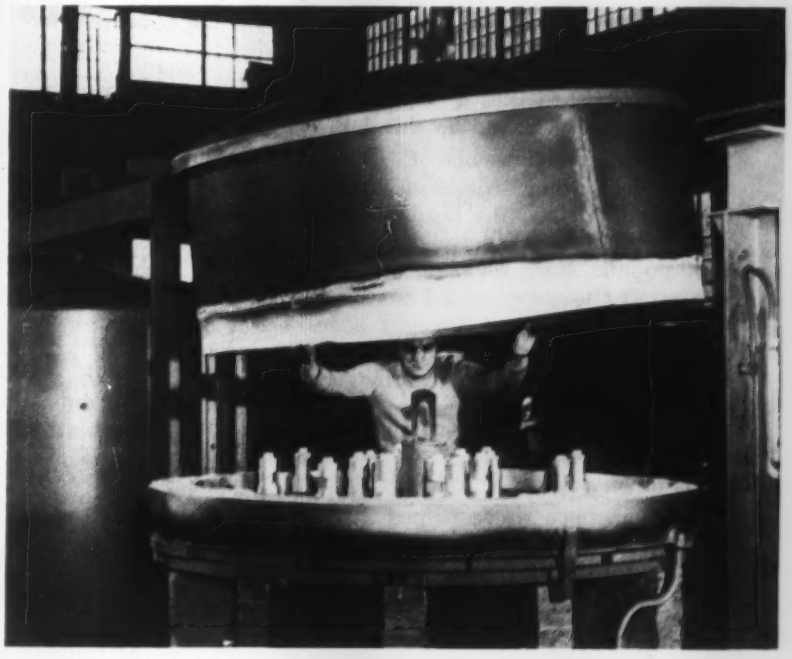
Limitations: A good hydrogen atmosphere must be used with lithium alloys, and no flux. Wetting and flow are so good that the alloy will no longer fill gaps of 0.005-0.010-in. Clearances should be reduced, preferably to zero, and even press fits of 0.001-in. can be used. There is less tendency to form fillets.

Plating—Type 321 with its small Ti content is sometimes difficult to braze when the Ti is on the high side of the permissible composition range. Copper plating is sometimes used to protect the surfaces from oxidizing or nitriding during copper brazing. Grit blasting prior to plating helps.

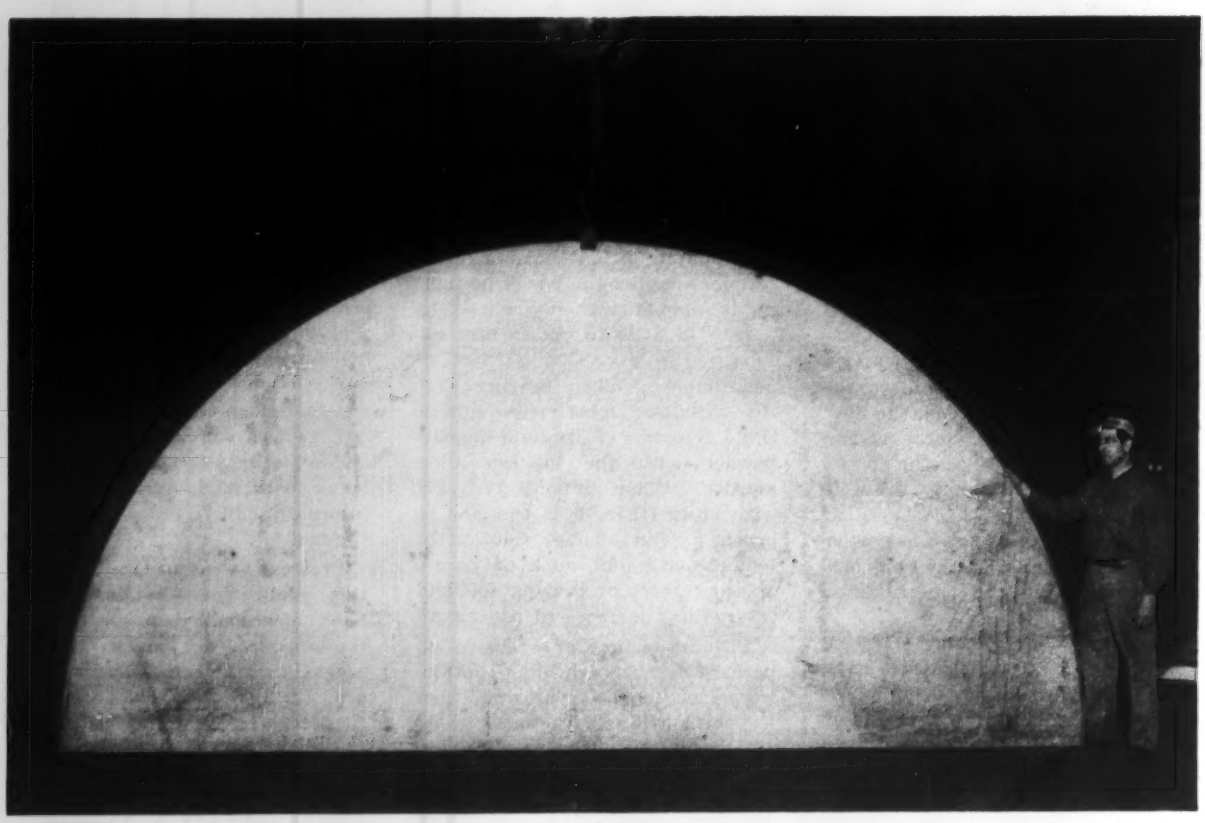
Type 347 varies in composition and sometimes contains Ti or boron or both as impurities and becomes difficult to braze unless pretreated.

Pretreat — Other ways to lick this small Ti contamination: 1. Pass unassembled parts through the furnace to oxidize the Ti, pickle them, then assemble and braze in a second trip through the furnace. 2. Coat the surfaces of the unassembled parts with a thin flux solution, pass them through the furnace (they should come out bright), remove flux deposit, assemble, prepare with brazing alloy and pass through the furnace.

Nickel plating generally is pre-



Lowering steel retort cover of bell furnace into sand-sealed tray on load-supporting base. Hydrogen inlet pipe to retort is at lower right



Carlson specialized service keeps your costs low

Here's how Carlson *specialized service* in stainless plate worked on this job.

The illustration shows one of two segments of a tank head blank. Made of 1″ thick, Type 302 stainless steel, the head blank measures 210″ in diameter and weighs approximately 9000 pounds. Each segment was produced so accurately the customer did not have to "true up" the abrasive cut straight edges before welding the two segments together. This meant the customer had what he wanted, the way he wanted it—produced to his exact requirements.

And here's why you'll want this *specialized* Carlson service.

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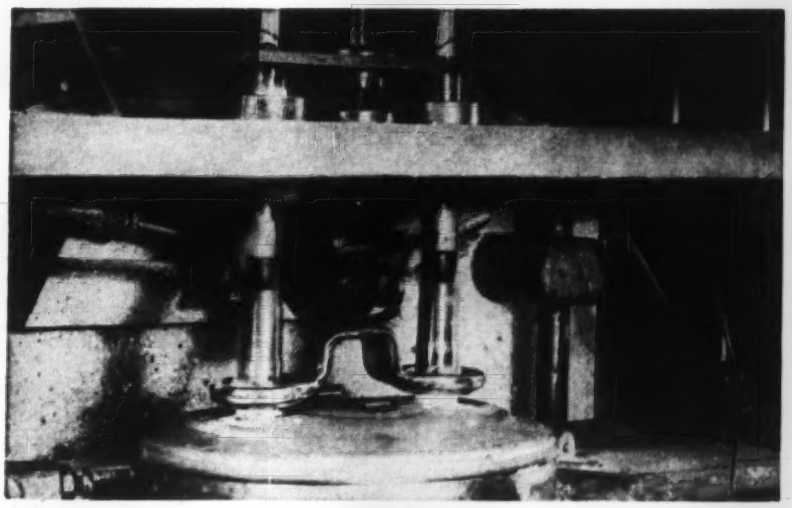


Induction brazing stainless nipples onto head of stainless water-heater tank. Preplaced wire rings of silver-brazing alloy and flux are used

ferred on high-titanium content alloys, such as A-286 and Inconel X. Nickel prevents oxidation in dry hydrogen during heating up and provides a good starter for wetting by the filler metal.

Coating—Wetting action on difficult metals can be encouraged by coating the surfaces with an alcohol solution of nickel nitrate. The nitrate breaks down at a low temperature, and the resulting nickel oxide is reduced rapidly by the hydrogen. This leaves sponge nickel which furnishes capillary attraction for the molten filler metal. The nickel seems to act as a catalyst in the cleanup of the stainless and aids wetting.

Titanium hydride in alcohol shows promise. The nascent hydrogen liberated from the hydride provides a fluxing or cleaning action to aid wetting. TiH_2 also is used successfully in bonding ceramics to metals.

Prevent Wetting

Frequently, it is necessary to prevent the filler metal from wetting portions of assemblies, fixtures, trays and metallic supports.

Refractory—It is customary to turn to refractory oxides—levigated alumina, magnesium oxide, magnesium hydroxide and titanium dioxide.

They are used as extremely fine powders suspended in alcohol, lacquer, acryloid cement or water. Slurries usually are brushed on.

Creep—Although these coatings can prevent wetting by filler metals on portions of assemblies which contact the coated surfaces, they will not necessarily form barriers for creep of filler metals on the assemblies. Filler metals often creep beneath the coatings.

Magnesium hydroxide is not effective as a stopoff on high-cobalt alloys, such as L-605 and vitallium, with AMS 4775 filler metals. It disappears.

Impregnating—Surfaces of base metals can be impregnated with refractory oxides to prevent wetting. On a jet engine assembly which is copper brazed, the flow of copper must be limited to a surface near the joints. Areas to be brazed are masked off with tape and the bare areas blasted with aluminum-oxide blasting grit.

Blasted surfaces are covered with masking tape and the original tape removed. The exposed surface is blasted with steel or silicon-carbide grit to encourage wetting by the filler metal. The tape is removed and copper-powder paste brushed on.

Another—In another stainless assembly which has several hundred copper-brazed joints, it is necessary to prevent certain tubes from being brazed to investment castings which they contact.

This is done by blasting the inner surfaces of the tubes and the mating outer surfaces of the investment castings with aluminum oxide grit.

Fixtures

It is best to design assemblies so they are self-fixturing. In many cases, it is necessary to use auxiliary fixtures to maintain parts in proper relationship, to support assemblies in proper position to assure the best flow of filler metal, to minimize distortion, to elevate assemblies above the base plate so that heat and atmosphere gas can circulate beneath them or to apply compression on the assemblies to assure intimate contact between the parts. Selection of the best material for fixtures is often a major point in the success of a furnace-brazing application.

Materials—Mild steel is used for load supports and fixtures in many instances. For stability, plates often are made about 1-in. thick. It is best to avoid restraining assemblies, such as by bolts.

Vertical steel tubular supports are made of perforated sheet, tubing or pipe, with punched or drilled holes. This ventilation prevents pocketing of air or moisture and allows free circulation of atmosphere gas. It also aids in heating and cooling.

Carburization of stainless may be caused by contact with mild-steel fixtures or their decarburization in dry hydrogen. While the depth of carburization in heavy sections may be slight during the brazing cycle, complete penetration may occur during brazing of light sections.

Oxide Coat—Inconel X and A-286 alloy, with their high titanium and slight aluminum contents, develop protective oxide coatings even in dry hydrogen atmospheres. Fixtures made of them often are pretreated in air or exothermic gas at elevated temperatures to assure the presence of the coatings which will prevent sticking or brazing of parts to the fixtures.

These metals also have better heat resistance, stability and strength than mild steel. Cast plates of type 330 stainless also are used for fixturing and load supporting where critical flatness and other dimensional tolerances must be maintained. Such fixtures require corrective machining or

Maytag switches to STANICOOL HD *Soluble Oil... makes two-way saving*

1 Cost of soluble oil reduced

2 Soluble oil consumption cut two-thirds

A 300 ton Verson press at the Maytag plant, Newton, Iowa, is used for piercing holes in the inner tubs of Maytag's fine automatic washers. Material used is 18 gauge enameling iron. Holes are pierced in six automatic cycles. A total of 936—$\frac{3}{16}$ inch holes and 6—$\frac{19}{32}$ inch holes are incised in each tub.

A check of manufacturing costs on the tubs disclosed that the cost of soluble oil per unit produced was too high. Standard Oil lubrication specialist J. I. Nelson, working with plant management, suggested a switch to STANICOOL HD Soluble Oil. The switch was made and Maytag received the first part of its two-way saving: the cost of soluble oil per gallon was reduced. Then it was found that the same high quality product could be turned out, without loss of tool life, while spraying only every third tub. Formerly *each* tub was sprayed with soluble oil before punching. With STANICOOL HD, Soluble Oil consumption was reduced two-thirds. And thus, Maytag received part two of its two-way saving.

Perhaps STANICOOL HD Soluble Oil can help you make similar savings. Find out more about this quality soluble oil. Call your nearby Standard Oil office. There is one near you in any of the Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Dwight Norton (right), a Maytag plant foreman, inspects automatic washer inner tub with Jesse I. Nelson, Standard Oil lubrication specialist. Jesse Nelson is well qualified to provide lubrication technical service. He has a B. S. degree in engineering from the University of Iowa and has completed the Standard Oil Sales Engineering School. Jesse has been helping customers with lubrication problems for more than three years. Customers find his experience and training pay off *for them.*

Quick facts about STANICOOL HD Soluble Oil

- Emulsifies readily with all waters.
- Forms stable, uniform emulsion.
- Does not turn rancid.
- Non-injurious to men, machines and work.
- Economical. Meets work requirements with relatively low emulsion concentrations.
- Prevents rusting of work and machines.
- Gives better tool life.
- Doesn't form gum on machines.

STANDARD

STANDARD OIL COMPANY
(Indiana)

periodic grinding. It sometimes helps to match coefficients of expansion of fixtures and assemblies as nearly as possible.

It is customary to prenormalize metallic fixtures by passing them through the brazing-heat cycle several times before machining to final flatness or dimensions to assure maximum stability when used with the assemblies to be brazed.

Graphite—An excellent fixturing material for use in inert atmospheres of argon or helium or in vacuum (but not in hydrogen) is graphite. It will retain its flatness or shape without distortion, is easy to machine, has high thermal conductivity, is light, has a low coefficient of expansion and can withstand heat shock without cracking.

A distinct disadvantage of hydrogen at elevated temperatures is that it reacts with graphite to form hydrocarbon gases, such as methane, which can transmit carbon to the assemblies being brazed and change their properties. Argon or helium do not react with the graphite or transfer carbon.

Carbon—If metal parts rest directly on graphite, carbon will diffuse into them, changing their properties (including melting point). Carbon concentrations build up to the extent that local melting of the base metal occurs when brazing with copper or other high melting point filler metals.

Asbestos slip sheets between the work and the graphite have been used where heating time is short, but local melting has been experienced with long heating periods in hydrogen because of the transmission of gaseous carbon.

The safest procedure is to use stainless-steel slip sheets, the thickness of which depends on the time cycle. In brazing honeycombs on graphite in an argon vacuum, 0.010-in. stainless slip sheets carburize only about one-third the way through when heated to 1825°F, and are scrapped after one usage.

Carbide—Silicon carbide holds its flatness as well as graphite and gives up its carbon to the work in the same fashion. But it has lower resistance to heat shock, higher density, is harder to machine and has lower thermal conductivity. Refrax, a silicon-nitride-bonded silicon carbide, is a new and superior refractory material which is useful for brazing fixtures.

Many ceramic materials have been tried as fixtures, and some are successful in small sizes. They have low coefficients of expansion, but, in general, they have low thermal conductivities and are often quite sensitive to thermal shock. Reasonably large fixtures crack.

Protective coatings of various oxides have been tried to isolate the graphite from hydrogen. Although they decrease carburization, they do not eliminate it, probably because they are porous.

Distortion

Stainless components often are highly stressed from cold working or welding and are likely to distort in furnace brazing. Their low thermal conductivity introduces the possibility of distortion due to uneven heating rates, particularly where thick and thin sections are involved.

It is often necessary to preheat the assemblies at 1100 to 1400°F before carrying them to the higher temperature for brazing. Slow cooling also will contribute to minimum distortion with nonuniform sections.

Procedure—In some batch brazing cycles on stainless assemblies, work is loaded in the furnace when it is about 1400°F. If the furnace temperature is higher—1600 or 1700°F—entry of the workload pulls the furnace down to about 1400°F, and the temperature is held there until the load approaches this temperature. After equalization, the temperature is set up in one or two steps.

When work is enclosed in a cold retort and charged into a hot furnace, heat shock on the load is somewhat minimized. Some assemblies are not so subject to distortion as others and can stand more heat shock. In such cases, it may be possible to place the load with its retort directly into the brazing chamber at its maximum temperature to obtain the maximum heating rate and production.

Slow Heating—Continuous furnaces, such as the mesh-belt type, heat the work gradually as it progresses slowly through the entrance throat. The entrance end of the heating chamber operates at a lower temperature than the outgoing end because of the high heat absorption of the cold work. Consequently, mesh-belt furnaces normally do not have preheating chambers, and temperatures are held at the highest possible values.

Sizable assemblies gradually entering and leaving the heating chambers are subject to warpage because of uneven heating and cooling, with radiant heat on one end and cold atmosphere gas on the other. This warpage has been minimized by surrounding each assembly with a thin sheet cylinder of stainless alloy extending higher than the assembly. It baffles the radiant heat while traveling through the throats but does not retard heating and cooling rates.

Part II of this article, to appear next week, will cover brazing equipment, time-temperature cycles and atmospheres for brazing stainless steels.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Tapered honeycomb panel of 17-7 PH stainless with 0.010-in. thick skin and 0.0015-in. core material. It is brazed with 85Ag-15Mn alloy in a vacuum envelope in argon in a box-type furnace

Vinyl Plated Steel

New source for plastic coated steel offers several colors and textures in limited quantities

EXPERIMENTAL production of vinyl coated, cold rolled sheets has started at U. S. Steel's Irvin Works (Dravosburg, Pa.), the corporation revealed this week. Production capacity has not been established, but sheets will be supplied on a developmental basis.

Appliance and partmakers who anticipate using them in new models can expect several advantages:

- The vinyl resists abrasion, takes bumps with less peeling or chipping than other coatings.
- It won't rust, even resists many chemicals.
- It has sound-deadening properties.
- It comes in a wide variety of colors and textures. Parts made from the material don't require a final finish.

Getting Started — Cold rolled steel first gets a surface treatment to improve its bonding properties. Only the top surface is coated with an adhesive.

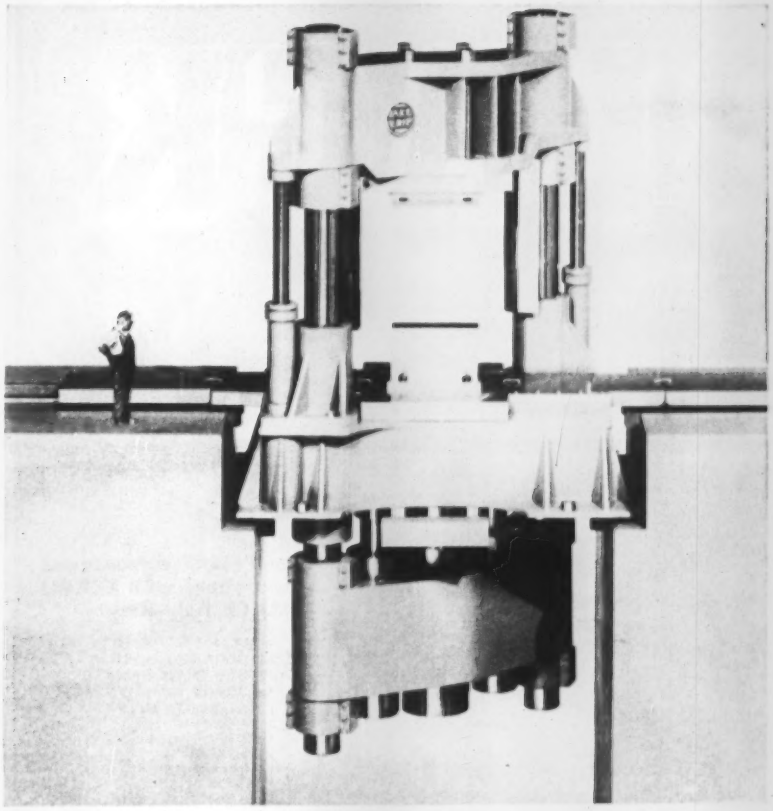
After a heat cure and cooling, the steel passes through a coating chamber where the vinyl sheet is laid on. Heat solidifies the plastic. Before it cools, the surface is embossed with any one of several designs or textures.

A magnetic piler stacks the sheets. Gages run from 18 to 28, widths 24 to 52 in.

Limitations — Ordinary forming and joining methods can be used with the material—welding and brazing are exceptions. Special dies or drawing compounds are usually not necessary. Draw dies should be highly polished and clearances carefully calculated.

Hi-Temp Furnace Report

HOW to produce extremely high temperatures in special furnaces is the subject of a recent 65 page report. It's a summary of five years of Navy research. You can get it by writing OTS, U.S. Department of Commerce, Washington 25, D. C. Cost: $1.75.



Preliminary model of Allegheny Ludlum's tool steel forging press

Unusual Press for Forging

AN INDUSTRIAL building clad with stainless is going up at the Dunkirk Works of Allegheny Ludlum Steel Corp., Dunkirk, N. Y. The 165 x 300 ft premium package will house an unusual piece of equipment.

It is a 2000-ton, pull-down forging press for the hot working of high alloy tool steels. Lake Erie Engineering Corp., Buffalo, is making it. Allegheny Ludlum engineering and production executives believe it is the largest press ever ordered for this type work. Its design is the result of a survey they made of press facilities in this country and Europe.

Upside Down—The single-action press is of the inverted type (see photograph). In its open position, it stands 19½-ft above the floor, 15 ft below.

The two press columns are set at opposite corners of the press bed, making the bed accessible from four sides. Clearance between the columns is 48 in. front to back and 90 in. side to side. Maximum working stroke is 72 in., with 130 in. of maximum daylight between top and bottom bolsters.

Bolster Slide — Instead of one bolster, the press has six, each 7 ft long and linked end to end. A hydraulically operated gear and rack mechanism moves them on a die slide through the press and 24 ft to either side. The bolster train will make it possible to change dies quickly, and have a choice of die sets ready to use.

Pull-down pressure is exerted through center and side cylinders operating in the under-floor area between the bed platen and the lower crosshead. Two cylinders flanking the columns and linking the bed platen and upper crosshead produce the push-back action. The press is designed to operate at 60 planishing strokes or 30 forging strokes per minute. It is expected to be in operation late in the year.

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Here's tough, durable kraft paper with BLACK polyethylene added to provide the best *weather resistant* protection yet! This latest of Thilco "firsts" embodies all the characteristics of clear Poly-Kraft with these *plus* advantages—Its black color absorbs the destructive ultra violet rays of the sun so strength of the paper combination is retained 2 to 4 times longer. And, because BLACK Poly-Kraft absorbs all wave lengths of the entire visible spectrum it provides an excellent light barrier where maximum opacity is required.

Thilco BLACK Poly-Kraft with its superior *weathering* qualities is "tailor-made" for such protective jobs as curing concrete; making temporary shelters; safeguarding sensitized papers; wrapping nursery plants and shrubs; covering and wrapping steel and metals, dried lumber, hygroscopic materials and numerous other products that require *protection from moisture, sun or light.* BLACK Poly-Kraft is obtainable in most any grade of base kraft and base paper combinations that Thilco offers. Get details today.

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It tells all about these new "Black Magic" Thilco papers — contains samples of several of the most popular plain Kraft and TufWet creped grades.

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Die Wear Forum

THE NEED for more uniform methods of measuring die wear and die life has given birth to a technical forum on the subject. It'll be on the program at the upcoming National Metal Show in Cleveland.

Paul G. Nelson, Budd Co., Philadelphia, will be chairman of the day-long meeting. Three topics are planned: 1. Minimizing die wear by die design. 2. Minimizing die wear by part design. 3. The effect of press speed on die life.

Attendance will be limited to 200. Participants must register by Sept. 21. Write: The American Society for Metals, 7301 Euclid Ave., Cleveland 3, O.

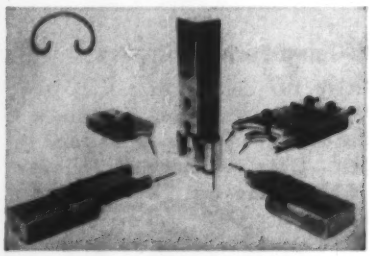
Flame-Plated Tools

MANDRELS flame-plated with tungsten carbide increased production for one manufacturer by 74 per cent. The wire forming tools shown in the illustration, slide in a horizontal plane to make a wire spring or clip around a vertically positioned mandrel.

Tungsten carbide, flame plated on surfaces which come into contact with the spring wire stock, not only increases tool life but also permits higher machine speeds. The rate was stepped up from 45 to 78 pieces a minute here.

Finish—The four forming tools were left in the as-coated condition. The vertical mandrel was finished to 50 microinches rms.

Flame plating (a process of Linde Air Products Co., a division of Union Carbide & Carbon Corp., New York) can be applied to most metals without danger of distortion. The temperature of the base metal seldom exceeds 400°F during the coating. The coating may be finished to 0.5 microinches rms by diamond lapping.



ARROWS show flame-plated surfaces

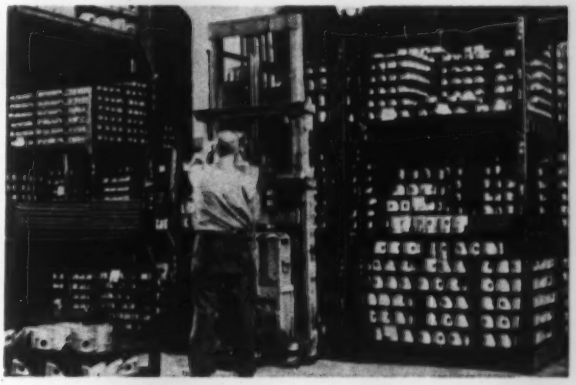
Portable Stacking Racks Speed Order Picking

These open-side steel frame units give shelves portability. They can be moved by fork lift or platform truck, according to the needs of production and inventory.

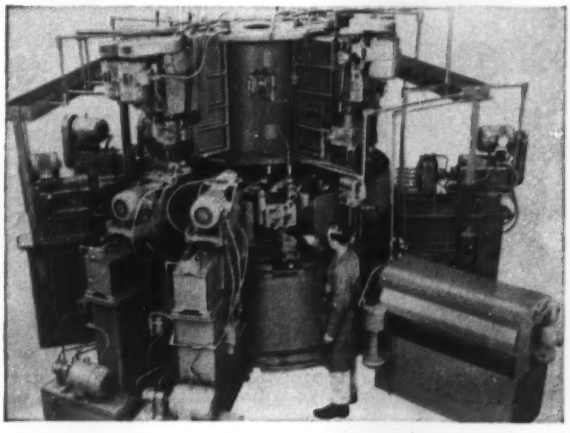
The units can be used as handling racks and moved right up to a work or processing area to receive finished parts.

The racks can be moved and stacked to any practical height whether loaded or unloaded. They can be used for permanent or temporary storage.

The units are made to the specifications of the material to be handled. *Write*: Pressed Steel Division, Republic Steel Corp., 6100 Truscon Ave., Cleveland, O. *Phone*: Michigan 1-0810



Center Column Machine Does 47 Operations



Model 334-S is an 18-station machine that uses a table 84 in. in diameter. It processes 120 refrigeration compressor housings an hour.

The fixtures, which accommodate either one or two-cylinder housings, use an expanding arbor to locate the part with respect to a previous roughing operation.

A total of 47 spindles are mounted on three, way-type units and 14 drill units. They are used to mill, drill, counterbore, spot face, bore, ream and tap.

Efficient mounting of the units makes the tools easily accessible. Vertical units are mounted on the stationary center column. Horizontal units are mounted on pedestals attached radially to the cast iron base. *Write*: Morris Machine Tool Co., 933-36 Harriet St., Cincinnati 3, O. *Phone*: Parkway 1-5616

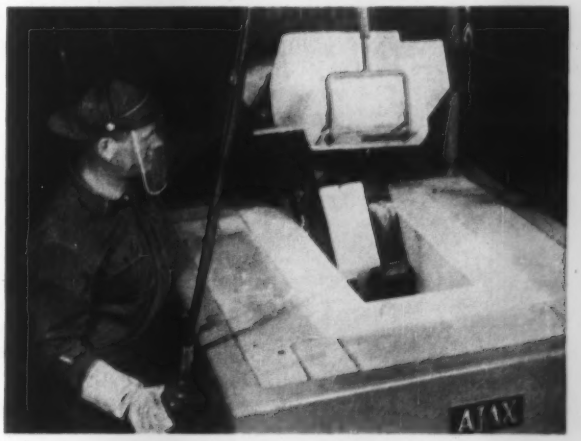
Salt Bath Furnace Eliminates Shutdowns for Electrode Changes

The removable, submerged electrodes in this furnace can be changed in an hour—less time than it takes for the molten salt to solidify. Labor requirements are reduced, and no production time is lost.

The electrodes are made of noncritical alloys. They enter the pot from over the top instead of through the back wall of the casing.

There are no openings below the surface of the salt. An easily removable tile over each pair of electrodes seals off all air. This assures longer electrode life by preventing oxidation that would normally take place at the air-salt interface.

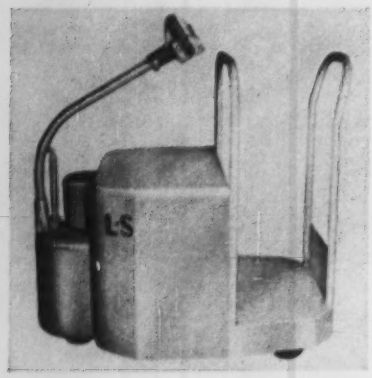
Pot life extends to ten years. Spare casings are no longer needed, and resoaking of new tile pots is not necessary because the original pot is used. *Write*: Ajax Electric Co., 952 Frankford Ave., Philadelphia 23, Pa. *Phone*: Nebraska 4-0548



NEW PRODUCTS and equipment

Electric Tractor

The lightweight tractor has speeds of 6.5 mph empty and 5.2 mph when pulling a 5000-lb load. The normal drawbar pull is 250 lb, maximum is 600 lb.



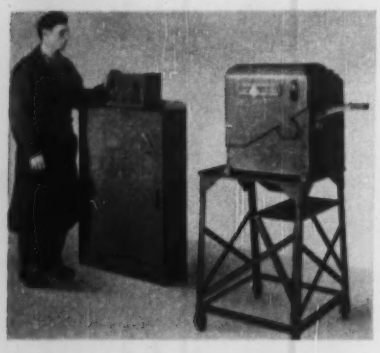
The brake and the first two speeds are controlled from the steering handle so that the truck can be used as a walkie truck. When riding, the operator obtains the third and fourth speeds with a button on the floor. *Write*: Department R-24, Lewis - Shepard Products Inc., Watertown, Mass. *Phone*: Watertown 4-5400

Gear Gaging

Spur or helical gears up to 3 in. in diameter and 3 in. wide can be inspected by the Model GRD automatic gear gaging, sorting and machine tool control unit.

It will shut down gear production machine tools automatically after a specified number and type of rejections. Lights indicate type of reject that caused the shutdown.

Machines are available to check and sort production gears for size or helix angle accuracy or both. *Write*: National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich. *Phone*: Walnut 1-8980



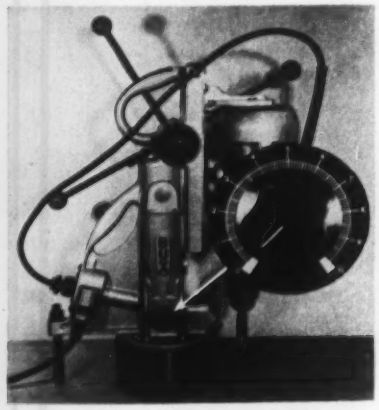
Titanium Wire Cloth

Industrial grades of titanium wire cloth are available in sizes from 60 mesh down through the coarser grades.

The cloth can be used for filtering or screening highly corrosive materials. Other potential uses include the screening of hypochlorite and chlorine dioxide in the pulp and paper industry. *Write*: Cambridge Wire Cloth Co., Cambridge, Md. *Phone*: Cambridge 1033

Electromagnetic Drill Press

The Bux model V-3 has a rheostatic control switch for selecting the proper magnetic pull to fit each job.



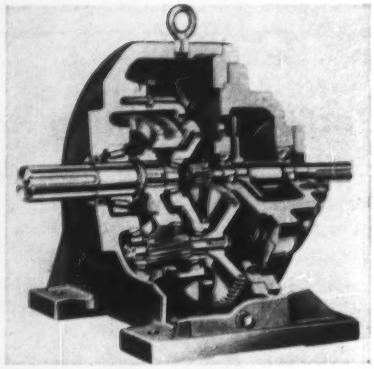
The drill operator selects the amount of magnetic pull he needs while positioning the unit, then turns on full power for drilling.

A pilot light assembly floods the drill point area with light. *Write*: Buck Mfg. Co., 100 Roberts Rd., Los Gatos, Calif.

Gear Reducers

Helical In-Line speed reducers meet the need of heavy duty gear drives on conveyors, packaging machines and process installations. They are available in single, double or triple reductions.

The units have crown shaved, induction hardened gears, oversize thrust bearings, heavy steel shafts, large overhung load capacity and



positive oil bath lubrication for gears and bearings.

Reduction ratio range: 1¼:1 to 205:1. *Write*: Philadelphia Gear Works Inc., G St. & Erie Ave., Philadelphia 34, Pa. *Phone*: Garfield 6-9400

Plastic Insulation

Franco-Therm is for use around air ducts, boilers, breechings, burner castings, fittings, gas generators, industrial furnaces and ovens, steam pumps and heaters. It's recommended for uses up to 1800°F.

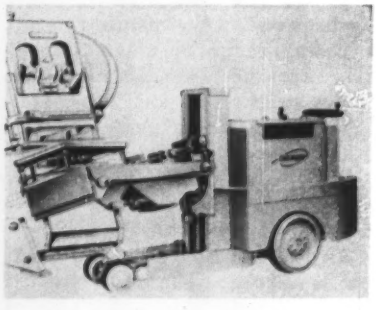
The material will absorb hot or cold water without harm. *Write*: J. H. France Refractories Co., 1944 France Rd., Snow Shoe, Pa.

Die Handling Truck

Dies can be removed from or set into medium and large size inclined presses by this 5000-lb capacity unit.

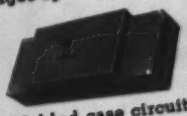
The die handler is built on the chassis of an electric powered high lift truck which has a rotating, 44 x 50 in. tilting platform.

By tilting the rear of the platform upward to match the angle of the press bed, dies can be pulled onto the platform over the end of the truck. The platform can be

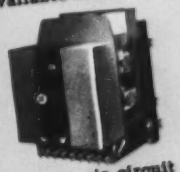


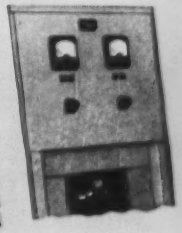
SQUARE D's NEW Unit Substation IN POWER-STYLE CONSTRUCTION

Designed to match Square D's Power-Style switchboards and control centers, these new Unit Substations meet NEMA, ASA, and AIEE standards. Available from 75 to 500 KVA; in primary voltages up to 4800v; secondary up to 600v.

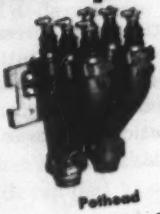


Molded case circuit breakers (*left*) up to 800 amperes and QMB Saflex fusible switches (*right*) up to 600 amperes are available in compact panel construction.

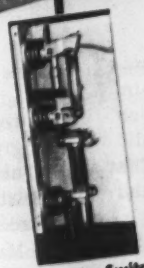




Large air circuit breaker (*above*) up to 1600 amps can be combined with a short panel in one section.



Pothead



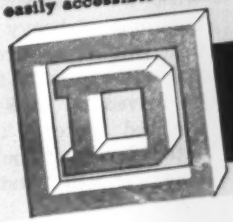
Interrupter Switch

Cutout

Potheads, fused or unfused load break air-interrupter switches and fused or unfused oil-filled cutouts are available. Air-interrupter switches and cutouts are easily accessible from front of Substation.

REAR VIEW

3 single phase, dry-type transformers individually mounted on base in ventilated enclosure—heating and vibration held to a minimum. Transformers easily accessible for maintenance and inspection. When no air circuit breaker or metering equipment is used, entire area at top left is available for pull box.



SQUARE D COMPANY

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE!

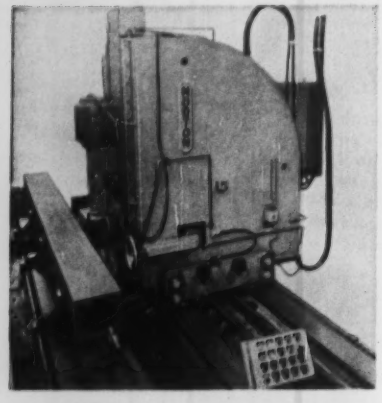
rotated to match the angle of the press bed. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Grinding Machine

This heavy duty machine grinds long straight surfaces or long irregular curved surfaces to template.

The wheel travels, and the work remains stationary. A compound saddle is mounted on the bed and is moved longitudinally by a chain driven by a variable voltage or reversing motor. Speeds go up to 100 fpm.

The spindle rotates in the vertical plane and is arranged so that grinding can be done either on the periphery of the wheel or with cup grinding.



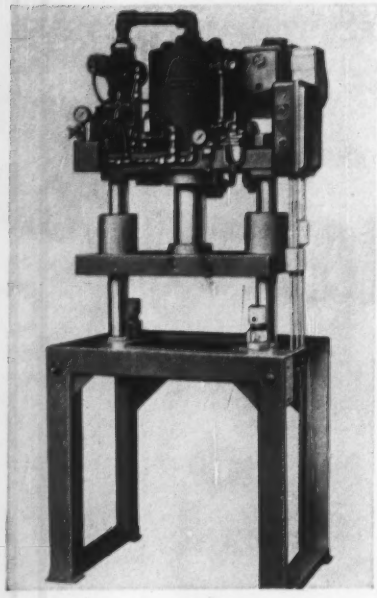
A bed of any length can be used. *Write*: Morton Mfg. Co., Broadway & Hoyt, Muskegon Heights, Mich. *Phone*: 3-2148

Trim Press

This 20-ton hydraulic unit is used for broaching, staking, swaging, stamping, shearing, blanking and forming. Vernier finger-tip controls adjust speeds from 0 to 600 ipm.

Connections to power, air and water are attached at the top of the machine. Electrical controls can be changed quickly from manual to fully automatic.

The stroke is adjustable from 0 to 12 in. Shut height between platens is 17 in. Working area between uprights is 23 in. The press is powered by a 3-hp motor. *Write*: Mohler Engineering Co., 33 Roetzer St., Buffalo 11, N. Y. *Phone*: Bailey 3944



Crane Shovel

You can get this ¾-yard shovel with crawler or truck mountings. The crawler crane is rated at 18 tons, the truck crane at 25 tons.

An independent boom hoist gives power-up, power-down control of the boom. *Write*: Marion Power Shovel Co., Marion, O. *Phone*: Marion 2-1151

Hard-Facing Electrodes

Tube rod electrodes for semi-automatic hard facing are 3/32-in. diam drawn tubular wire which acts much like mild steel solid wire in the welding machine. The wire is a work-hardened steel shell which encloses various alloys.

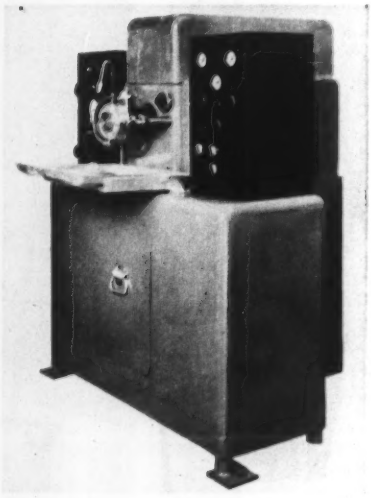
The electrodes can be driven by the feed rollers found in all semi-automatic hard-facing welders. High metal deposition, long wear life of parts and fast, easy welding are given by the electrodes. *Write*: American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill. *Phone*: Skyline 4-2200

Honing Machine

This machine features instantaneous electronic control of speeds in the 100 to 1600 rpm range.

Automatic cutting speeds for roughing start on the low side. When the part is within a predetermined ten-thousandth of finish size, the machine automatically shifts to an extremely high speed, assuring a microfinish.

Automatic sizing ends the honing cycle when the desired size is reached and also permits the operator to visually explore the bore during honing.



Automatic stone pressure control gives the right cutting pressure as determined by stone characteristics and part specifications. *Write*: National Pioneer Inc., Box 668, Muncie, Ind.

Press Brake

A 3-ton, hand-propelled crane with an electric hoist for the handling of heavy plates is built into this press brake.

The crane is 18 ft long and can be moved up to 8 ft in front of the bed center. The machine is rated for ⅝-in. mild steel 20 ft long. It will handle 16 ft plates

HUMIDITY IS BAD FOR METALS, TOO

Humidity causes RUST . . . and rust causes losses of millions of dollars where metal has not been protected properly.

Protecting industry from rust losses is a job Houghton has been doing effectively since 1869. In these 87 years of experience, practically every kind of rust problem has been tackled, and a line of RUST VETO products developed to solve them.

RUST VETO 344, for example, gives positive year 'round protection to metal stored outdoors. It requires just one application, can be handled in 4 hours, won't harden, crack, or peel, and can be removed easily.

RUST VETO 377 is outstanding for long term indoor or shed storage. It provides a soft but durable film, easily removed with solvents.

If you have a corrosion problem, let Houghton research solve it for you. Call the Houghton Man, or write to E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.

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NOW SHIPPED IN EASY-TO-HANDLE 50-POUND DOUBLE BURLAP BAGS

Round, solid, tough—Tru-Steel has everything you expect in steel shot—obtainable only through precision control of manufacturing processes, unsurpassed plant facilities and the know-how of specialists whose only business is the manufacture of steel shot. Tru-Steel sells and stays sold on the basis of test and comparison. Write us.

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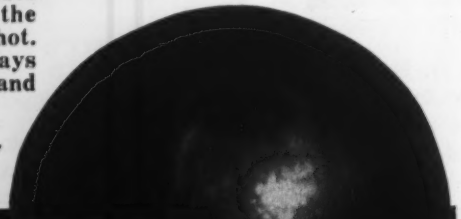
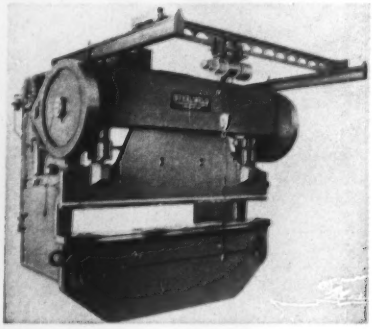


TRU-STEEL SHOT

Manufactured by
STEEL SHOT PRODUCERS, INC.
Butler, Pa.

NEW PRODUCTS and equipment

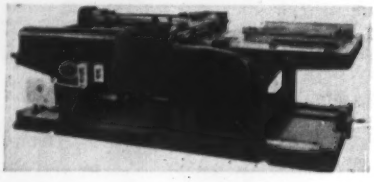


between housings. Two speeds are provided: 7 or 21 strokes a minute. *Write*: Cleveland Crane & Engineering Co., E. 289th St., Wickliffe, O. *Phone*: Wickliffe 3-3700

Trimmer and Slitter

The 5225 is a two-unit machine for high speed can lines. It is mounted on a common base and driven in unison by a geared-head motor.

The machine can handle from 30 to 70 sheets a minute. It can be used to trim and square up tin plate for lithograph presses and can machinery, or to trim and slit



sheets into blanks for the body maker.

Cutters can be sharpened in place. Bearing housings can be removed without dismantling the rest of the slitter. *Write*: Can Machinery Division, E. W. Bliss Co., 50 Church St., New York 7, N. Y. *Phone*: Rector 2-3052

Hydraulic Feed Units

Balanced thrust is featured by these units for production machines. Standardized components for both horizontal and vertical ways give positive control of rapid traverse, fine feed and depth.

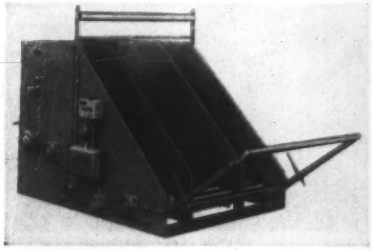
The unit develops a maximum thrust of 12,000 lb. The feed rate is infinitely variable from 0 to 24

in. Rapid advance is 8 ips; rapid return is 5 ips. Rapid advance and feed stroke lengths are adjusted by repositioning control dogs. *Write*: Hartford Special Machinery Co., 294 Homestead Ave., Hartford 12, Conn. *Phone*: Jackson 5-1401

Coil Feeding

Coils weighing 1200 to 16,000 lb are handled by Koil-Kradles. Maximum coil size is 48 in. wide, 60 in. in diameter.

The units can supply and maintain a slack loop from which any automatically fed machine can draw. This feature makes higher running speeds practical, automatic feeding devices more accurate.

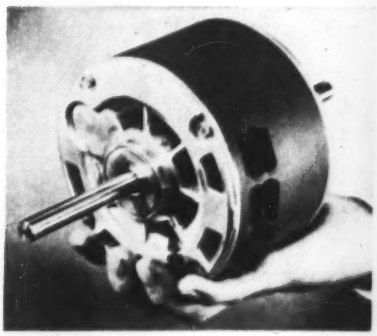


The actuating linkage is adjustable within 90 degrees to permit the use of either the inside or outside of the slack loop. Material can be fed directly to a punch press. *Write*: Benchmaster Mfg. Co., 1835 W. Rosencrans, Gardena, Calif. *Phone*: Plymouth 6-8134

Fan Motor

This permanent split capacitor fan motor is for use in room and console air conditioners.

Ratings range from 35 millihorsepower to 1/6-hp. The unit, which is 4¼-in. long, is capable of



Keep Plant Air CLEAR of Welding Fumes

Welding shops equipped with Ruemelin Fume Collectors are assured of a clean, healthful atmosphere. Harmful fumes, heat and smoke are eliminated *at their source*, before they have a chance to spread throughout the shop. This lessens fatigue . . . improves working conditions . . . paves the way for increased plant production. Ruemelin Fume Collectors are approved by Industrial Commissions and insurance companies. Thousands in service. Available with 9 ft., 15 ft., 17 ft. and 20 ft. reach. Write for Bulletin No. 37-E.

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NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

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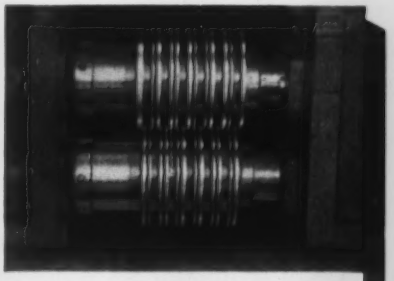
COWLES
SLITTING KNIVES



Cut costs 3 ways

Cowles knives reduce set-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;— they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.

For maximum economy and satisfaction order your knives and spacers from Cowles, world's largest manufacturer of rotary slitting knives. Prompt delivery. Complete range of sizes and analyses for slitting high and low carbon steels, stainless, alloys, silicon or non-ferrous metals.

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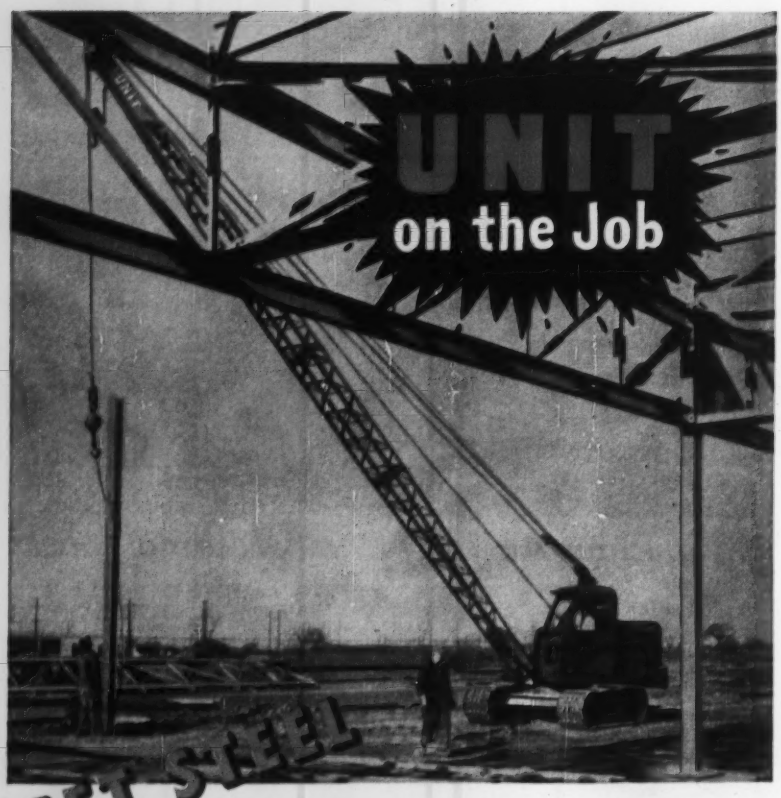
ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.



SET STEEL - *Easy and Fast with* **UNIT**

Lifting, carrying and spotting steel girders into the exact position requires STABILITY — FLEXIBILITY and PERFECT CONTROL. A UNIT Crane gives you all these features . . . and more. Extra Long Crawlers — Multiple Hinged Shoes — Wide Axles and Hook Rollers provide perfect stability. Smooth accurate control of boom and hoist lines permits precision handling. UNIT'S FULL VISION CAB gives the operator excellent visibility . . . makes steel setting jobs easier and faster. UNIT equipment can be quickly and easily converted to handle a wide variety of work. To speed up your steel construction, investigate UNIT. Write for literature.

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½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

All Models Convertible to ALL Attachments!

A 7236-2/3-PC

NEW PRODUCTS and equipment

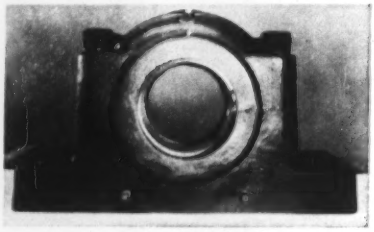
delivering a 100-watt output.

With average summer use, the motor needs no lubrication. Built-in lubrication provides five years of service under normal operating conditions. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Mill Bearings

Bearings for shafts up to 11 in. in diameter are included in this line for steel mills, mines, foundries, oil fields and similar operations where severe radial and thrust loads are encountered.

Self-aligning bearings carry full loads even when subjected to shaft deflections caused by heavy shock loads or support inaccuracies.



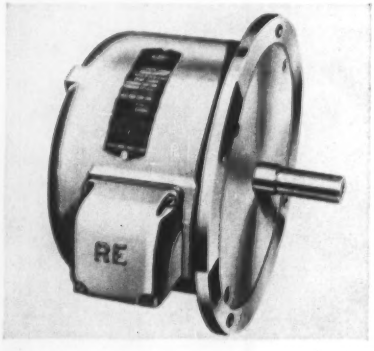
Rugged steel housings with large machined bases withstand heavy pounding.

Maintenance is reduced by large lubrication reservoirs. *Write*: Department PR, Link - Belt Co., Prudential Plaza, Chicago 1, Ill. *Phone*: Randolph 6-7790

Machine Tool Motors

Vibrationless operation makes these precision motors suitable for powering machine tools.

Rotors are balanced dynamically and installed between two heavy



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THE 1956 IRON & STEEL EXPOSITION

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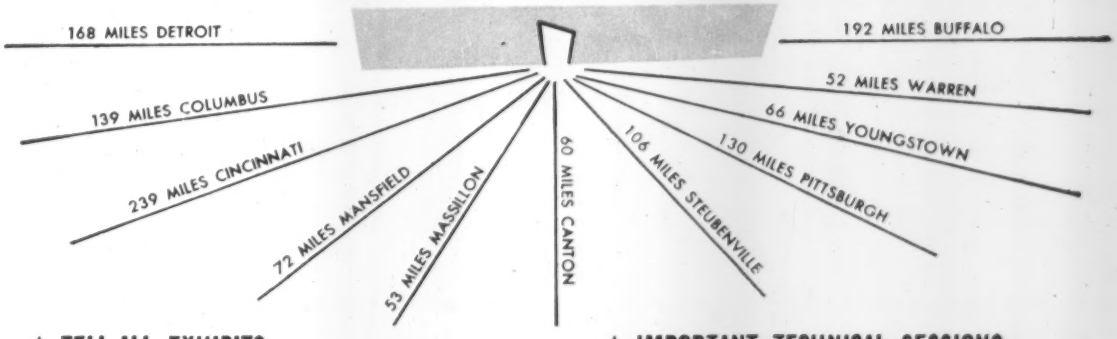

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Four full days of intensive technical sessions offer a liberal education in "What's New" in steel plant operation, methods, planning, maintenance and many other pertinent subjects.

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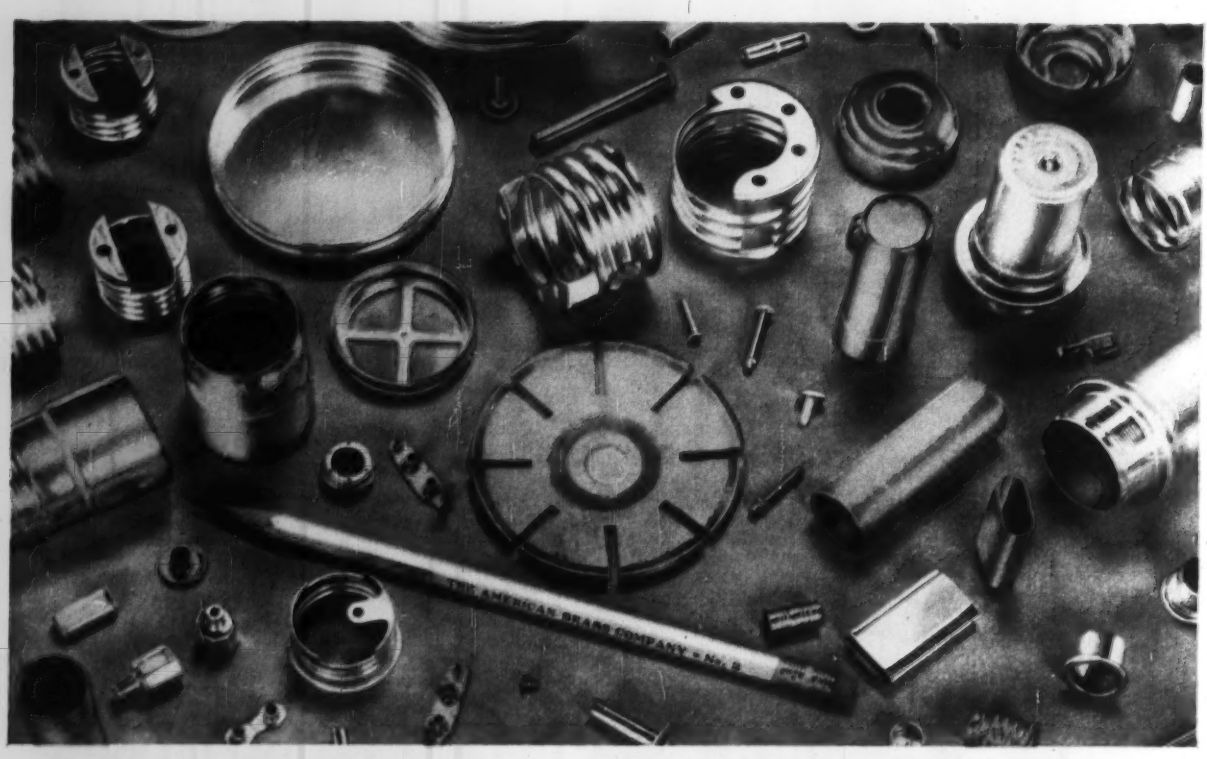
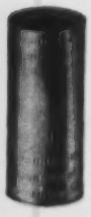
Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22, Pa.



Why should you use valuable floor space to make parts like these?

FERRULES
for desk and chair legs, pipes, tool handles, cutlery handles and pencils, etc.



EYELETS
for all types of industrial fastening applications

GROMMETS AND WASHERS
standard sizes in stock for canvas and fabric hardware and other uses

STAMPED PARTS
of every description, including washers of heavy or light metal

SCREW SHELLS
for lamps, tubes, all electrical applications

DEEP DRAWN PARTS
cups and shells of all types, finished or unfinished

The American Brass Company has specialized equipment, such as high-speed multiple-plunger presses, for the economical production of parts like these for industry. It has thousands of stock tools which may save costly tool charges—tools and techniques developed over a century of service to manufacturers.

Your choice of metal: Parts like these can be furnished in copper, brass, bronze, nickel silver, nickel, iron, stainless steel, steel, and aluminum – in a wide variety of finishes.

Standard products: For a selection of more than 1000 eyelets of common sizes and styles, as well as eyelets kept in stock, write for Catalog BG-1.

Special products: Just send a sample, drawing, or description, together with quantity and other pertinent information. Address: The American Brass Company, Fabricated Metal Goods Division, Waterbury 20, Conn. 5662 (Rev.)

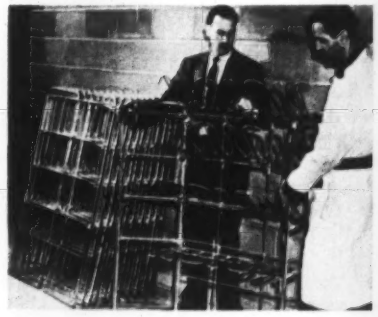
ANACONDA® MULTIPLE-PLUNGER PRESS PRODUCTS

duty ball bearings. A lightweight, low inertia rotor is used to assure smooth starts and quick stops.

They are available in ratings from ½ to 3 hp for continuous or intermittent duty. *Write*: Reuland Electric Co., Alhambra, Calif. *Phone*: Cumberland 3-4171

Wire Racks

These durable material handling racks transport components from one processing unit or machine station to another.

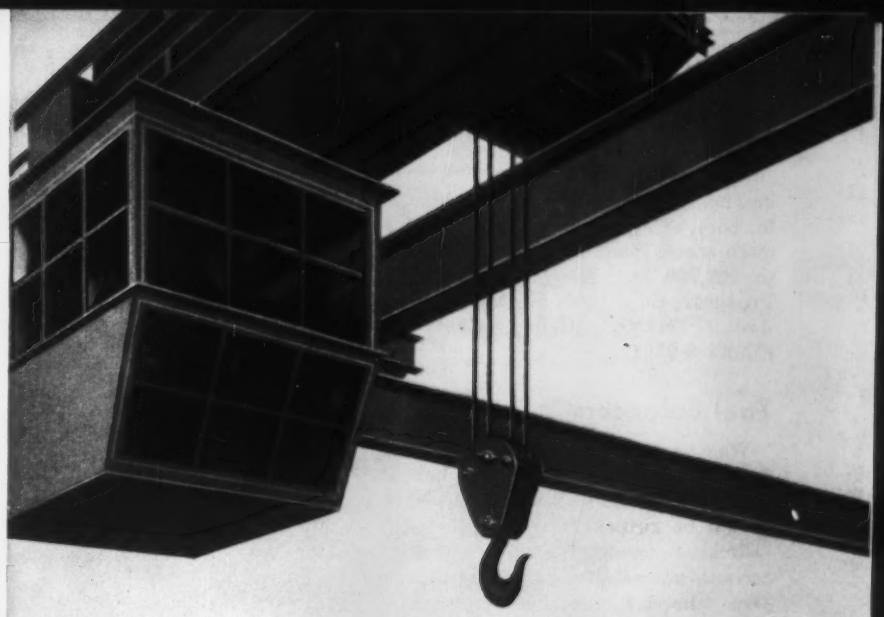


They are collapsible, which makes for easy, compact storage. Wire formations in the shelves can be profiled to the products being handled. Nesting is easy. *Write*: E. H. Titchener & Co., 67 Clinton St., Binghamton, N. Y. *Phone*: 4-4354

Bearings

The SCB series of self-aligning, plain, spherical bearings is made of a one-piece ball and a one-piece race to take increased radial and axial thrust loads.

They reduce lost motion in linkages and withstand excessive vi-



The **operator** of a Conco engineered Crane can be safer, more productive, less fatigued. There's the safety of true vertical hook travel, of s-m-o-o-t-h travel and lift. There's the safety of design based on deflection limits, often exceeding standard factors of safety. Production is speeded by application-engineering that combines the right speed, span, lift, travel and clearance. Over 37 years experience are behind features which makes Conco Cranes first with operators. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.

FROM ANY VIEWPOINT
A FINER CRANE

CRANES HOISTS CONCO

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JIB CRANES | ELECTRIC HOISTS | CHAIN HOISTS AND TROLLEYS | HAND GEARED CRANES | CRANE ASSEMBLIES

bration. Sizes are for 3/16 to 1⅞-in. bore. Capacities of radial ultimate static loads range from 3000 to 153,700 lb. *Write*: Southwest Products Co., 1705 S. Mountain Ave., Duarte, Calif. *Phone*: Elliott 8-0181

Tool Balancers

Waste motion and operator fatigue are reduced by tool balancers in this line. Loads up to 50 lb can be suspended.

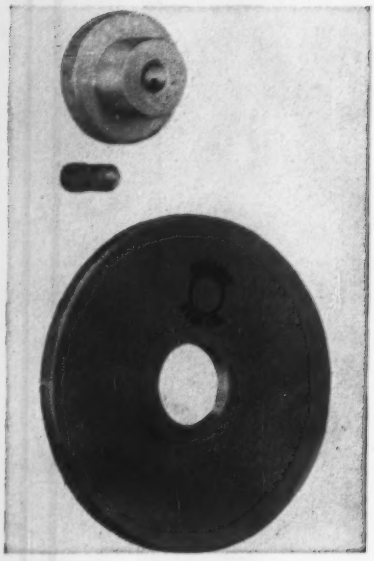
Smaller models handle screw drivers, nut setters, drills and tappers. Impact wrenches, multiple nut setters and other heavy tools are handled by models with capacities of 20, 30, 40 and 50 lb.

Straight-line pull eliminates excessive wear on the cable. Tension on it is adjusted easily to meet load requirements. Adjustable cable stops suspend the tool at any convenient height. *Write*: Keller Tool Division, Gardner-Denver Co., Grand Haven, Mich. *Phone*: 551

Precision Gears

These gears (120 diametral pitch in 14½ and 20 degree pressure angles) are for use in instrumentation.

Stainless and aluminum hub type gears are available in precision classes I and II. The 303 stainless gears have from 20 to 120 teeth; the 24 ST aluminum gears have from 61 to 120. Bores range from 0.1200 to 0.1875.



Aluminum hubless gears are available with 121 to 300 teeth. *Write*: Dynamic Gear Co. Inc., 20 Merrick Rd., Amityville, N. Y. *Phone*: 4-4788

Defoamer

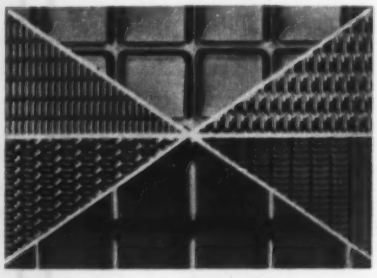
Antifoam B is a fast-acting, stable silicone defoamer which is effective in concentrations of 3 to 30 parts per million.

It is instantly dispersible in aqueous systems. In most continuous processing uses, it will not oil out, plate out, settle or precipitate. Storage problems are reduced because the product is resistant to heat and cold. *Write*: Dow Corning Corp., Midland, Mich. *Phone*: Temple 2-2371

Metal Patterns

Six embossed metal patterns come in nonferrous and ferrous alloys. Gages are 0.12 to 0.040-in.

They are for use on automobiles, hardware, appliances, lighting fixtures, gift items, radios and TV sets. Patterns with perforations



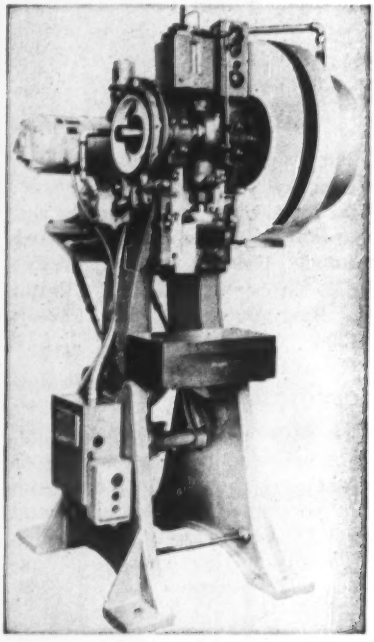
are available. They are furnished unfinished or in anodized lacquered and plated finishes. *Write*: Department 10, CroRoto Division, Croname Inc., 3701 N. Ravenswood Ave., Chicago 13, Ill. *Phone*: Bittersweet 8-7500

Continuous Gaging

The analyzing totalizer makes a card record of rolled strip metal. The card printer, actuated by a Model D classifying control, prints a permanent record in numerical rather than chart form. The unit may be added to existing continuous gaging systems. *Write*: Pratt & Whitney Co. Inc., West Hartford 1, Conn. *Phone*: Adams 3-7561

Reclinable Presses

These high production machines are designed for maximum rigidity with minimum deflection.



The relationship of the flywheel to the crankshaft eliminates bending stresses from the flywheel. Other features: Air clutch and brake, variable speed drive, automatic lubrication, overload protection, adjustable stroke and electropneumatic controls.

Speeds range up to 600 strokes a minute. *Write*: Zeh & Hahnemann Co., 188-2 Vanderpool St., Newark 5, N. J. *Phone*: Bigelow 3-4747

NEW Literature

Write directly to the company for a copy

Compressors

Bulletin 2307, 6 pages, describes a portable compressor with a capacity of 85 cfm. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Engine Lathe

Bulletin HD-127, 10 pages, gives details of a 16-in. engine lathe and a plain bed gap lathe. R. K. Le Blond Machine Tool Co., Cincinnati 8, O.

Acid Resistant Brick

Engineering drawings show construction methods for acid resistant brick installations. Pennsylvania Salt Mfg. Co., 3 Penn Center Plaza, Philadelphia 2, Pa.

Xerography

A 4-page bulletin illustrates the use of xerography in the preparation and alteration of lists for visible photo panels. Department HA-2, Haloid Co., Rochester 3, N. Y.

Overhead Handling

Principal components of overhead material handling systems are discussed in bulletin 2008-M, 12 pages. Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O.

Control Valves

Three and four way directional control valves for fluid power systems up to 3000 psi are described in bulletin 80300, 16 pages. Oilgear Co., 1593C W. Pierce St., Milwaukee 4, Wis.

Stainless Steel

Elevated temperature properties of full hard type 301 are given in a 4-page bulletin. Allegheny Ludlum Steel Corp., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Battery Truck Motor

A traction motor for low-voltage electric vehicles is described in bulletin GEA-6532, 6 pages. General Electric Co., Schenectady 5, N. Y.

Thermocouples

Bulletin 5, 14 pages, describes miniature protected thermocouples for use in highly corrosive gases and liquids. Thermo Electric Co. Inc., Rochelle Park Post Office, Saddle Brook, N. J.

Dihedral Couplings

Standard, floating shaft and mill motor couplings which handle up to

Why you get more service from V-Belts with CONCAVE SIDES

Fig. 1

Fig. 1-A

Each sidewall of a Gates V-belt is concave (Fig. 1)—a precisely engineered curve that makes V-belts last far longer.

HERE'S WHY: on the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave *evenly*. This even contact distributes wear uniformly across the sides of the belt.

Uniform wear lengthens belt life; keeps costs down.

MAKE THIS SIMPLE TEST

Fig. 2

Fig. 2-A

Bend a straight-sided belt (Fig. 2). The sides bulge at the bend causing uneven contact in the pulley groove (Fig. 2-A). Naturally, wear is greater at points indicated by arrows. Result: shorter belt life, increased belt costs.

To cut down-time and V-belt replacement costs, specify belts that grip evenly and wear longer. Specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

Gates

TPA 109

Gates VULCO ROPE Drives

NEW LITERATURE . . .

12 degrees of angular and offset misalignment are presented in bulletin 62, 8 pages. Ajax Flexible Coupling Co. Inc., Westfield, N. Y.

Tube Expanders

Catalog 81, 32 pages, specifies a line of tube cutters and expanders. Gustav Wiedeke Co., 1833 Richard St., Dayton 1, O.

Automatic Lubrication

A 2-page service instruction sheet gives operating information on high capacity, spring discharge, piston pump lubricators adaptable to machines requiring closely controlled but infrequent oil service. Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N. J.

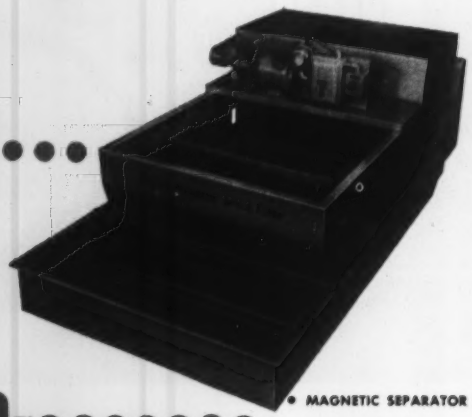
Tractor Shovels

An 8-page bulletin, 304, gives case histories on handling bulk materials with tractor shovels. Frank G. Hough Co., 876 Seventh St., Libertyville. Ill.

Conveyor Safety

Ten rules for installing a conveyor are cited in a 4-page bulletin. Jervis B. Webb, 8951 Alpine Ave., Detroit 4, Mich.

1 Unit... 3 Filtration Processes



• MAGNETIC SEPARATOR
• GRAVITY ATTRACTION
• FILTRATION

Delpark UP-FLO MAGNETIC SEPARATOR AND FILTER

...WITH PERMANENT FILTER SCREEN and 3 COMPLETELY AUTOMATIC CLEANING DEVICES

Combines the new Delpark powerful magnetic separator with a permanent filter media bar stock screen. Swarf bearing liquids flow on top of a large flat magnetic field. Magnetic unit incorporates more Alnico #5 magnets, gives twice the width of field, brings all swarf in suspension within the influence of the magnetic field, puts gravity to work in assisting the magnets and prevents washing and turbidity by using low velocity flow. This feature is particularly desirable on high viscosity fluids.

Three cleaning devices, completely automatic, remove the separated residue from the unit. Chain driven flights remove deposits from the magnetic field and the bar stock screen. .004" bar screen is cleaned by an air shaker device to dislodge enmeshed particles. A drag-out unit is built into the clean coolant tank.

Up-Flo Filters are available without magnetics for non-ferrous metal applications.

See your Delpark representative for more complete information or write.

Delpark FIRST IN FILTRATION ADVANCEMENTS

NEW BOOKS

Engineering Formulas and Tables, Lefax Publishers, Philadelphia 7, Pa. 350 pages, $2.75.

Basic formulas, design data and tables for civil, mechanical and electrical engineers are presented in this pocket-size book.

Container Size and Pallet Pattern Selection Criteria for Use on 40 *x* 48 *In. Pallets,* J. P. Akrep and S. Stambler, Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. 140 pages, $3.

Here is a graphic method which expedites the selection of loading patterns for 20,000 sizes of containers.

Oxygen in Iron and Steel Making, J. A. Charles, W. J. B. Chater and J. L. Harrison, Butterworths Scientific Publications, 88 Kingsway, London, W.C.2, England. 309 pages. $5.88, plus postage.

Three applications of oxygen are discussed: Treatment of the molten metal, blast enrichment in solid fuel combustion, flame enrichment.

ASTM Standards on Copper and Copper Alloys, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 654 pages. $5.75.

Standards cover copper and copper alloy plate, sheet, strip, rod, bar, shapes, die forgings, wire, pipe, tubing, filler metal and methods of testing. Also included are standards for copper, copper alloy and copper-covered steel electrical conductors; copper alloy ingot; and copper alloy castings.

Nuclear Fuels, David H. Gurinsky and G. J. Dienes, D. Van Nostrand Co. Inc., Princeton, N. J. 364 pages. $7.50.

Here is a compact report on the status of nuclear fuels. Three sections cover the metallurgy of uranium and thorium, radiation effects, solid and fluid fuels.

Year Book for 1955, American Bureau of Metal Statistics, 50 Broadway, New York 4, N. Y. 127 pages. $3.

World-wide production and other economic statistics for 1955 and prior years are given. Metals include copper, lead, zinc, aluminum, gold, silver, tin, antimony, cadmium, cobalt, magnesium, molybdenum, nickel and platinum.

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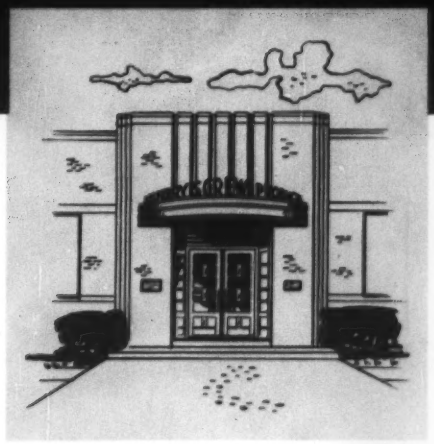

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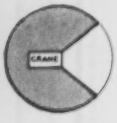

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360° visibility from I. B. patented Monitor Type Cab.

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BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

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BROWNHOIST

STEEL

September 3, 1956

Market Outlook

THIS is shaping up to be the second-best steel production year in history. Output of steel for ingots and castings should total around 114.5 million net tons. The record is 117 million tons —set last year. Until now, the second-best year was 1953 (111.6 million tons). If there hadn't been a steelworkers' strike, a new record would have been chalked up in 1956.

BREAKDOWN— A 114.5-million-ton output for 1956 is based on 64.2 million tons in the first seven months, 7.9 million in August, 10.4 million in September and 32 million in the final quarter. A 10.4-million-ton September would represent 98.6 per cent of capacity, and 32 million tons in the fourth quarter would push the figure to 98.9 per cent.

Last September, the nation's mills operated at an average of 95.7 per cent of capacity. In the fourth quarter, the rate was 98.6 per cent.

HIGH PRODUCTION— The national average is already up to 97 per cent (in the week ended Sept. 2). This is another 1.5 points of recovery since the steelworkers' strike. A year ago, the rate was 92.5 per cent.

Steelmakers will have enough orders to make a 114.5-million-ton year. Their well-filled order books are reflected in the speed with which the steel industry has resumed production since the steel strike.

FILLING UP— A good volume of orders continues to flow in, and it looks as though producers will have no trouble in filling up for the rest of the year. Although some mills will not open fourth-quarter books until mid-September, others are actively booking tonnage for that period. Because of third-quarter carryovers resulting from the strike, fourth-quarter tonnage to be sold will not exceed six weeks' production in some products—less in others.

If the automobile industry returns to the steel market with force, there will be a scramble for steel in the last quarter.

INVENTORIES DOWN— Consumers can't rely entirely on their steel inventories, for stocks were reduced around 50 per cent during the strike. Some of the inventories are somewhat unbalanced. During high consumption of steel, users try to build, or at least maintain, inventories. In any event, they try to buy steel as fast as they use it.

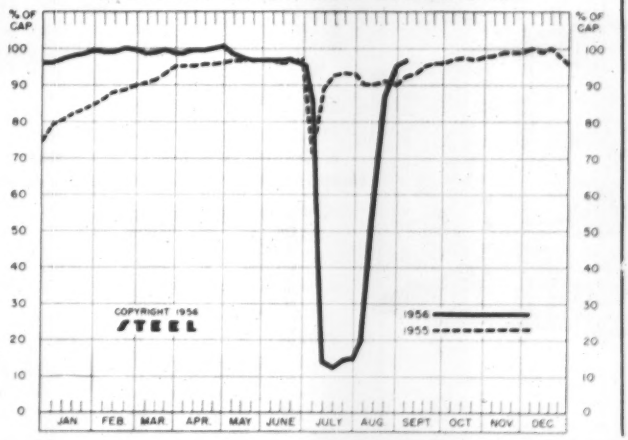
BUSINESS BUILD-UP— Steel usage will be heavy, even if the automobile industry doesn't make a splurge. The dollar volume of unfilled orders for durable goods is around 20 per cent higher than it was a year ago. To fill this increased order backlog, a lot of steel will be needed.

BEATING A DEADLINE—Tin mill products are in strong demand. One of the reasons is an expected increase in their prices on Oct. 31. Tin mill products are priced under a six-month contract, so they did not go up a month ago with other steel products.

Producers continue to adjust prices upward in line with increases announced a month ago by U. S. Steel Corp. As a result STEEL's finished steel price composite is up to $137.75.

STEEL's price composite on steelmaking scrap continues to reach new highs. In the week ended Aug. 29, it hit $58.83 a gross ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Sept. 2	Change	Same Week 1955	Same Week 1954
Pittsburgh	97.5	+ 1.5*	95	67
Chicago	97	— 0.5	95.5	67
Mid-Atlantic	96	0	94	61
Youngstown	95	0	96	64
Wheeling	97.5	+ 2.5	93.5	70.5
Cleveland	103.5	+ 3.5*	98	51
Buffalo	105	+ 2.5	105	56
Birmingham	93.5	+ 8.5	93.5	62
New England	90	0	72	51
Cincinnati	68.5	—17	90.5	52
St. Louis	89	— 3*	105	56
Detroit	92.5	+ 2.5	87.5	59.5
Western	94	+ 5	103	78
National Rate	97	+ 1.5	92.5	64.5

INGOT PRODUCTION‡

	Week Ended Sept. 2	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	147.9†	148.9	25.8	140.4
NET TONS (In thousands)	2,376†	2,359	415	2,255

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 39 Technical Outlook—p. 77

J&L SHEET STEEL ON ANOTHER *Important* JOB

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Crowded, inefficient general office areas

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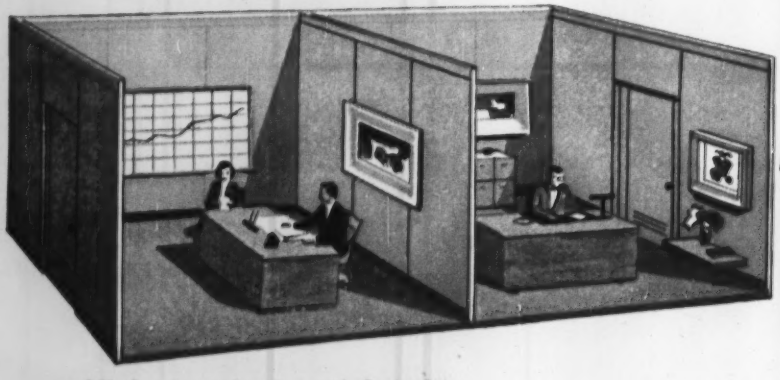

... efficient, private work units

Steel interior walls, easily installed and quickly rearranged, provide business management with an efficient means of allocating expensive floor area to keep pace with changing space requirements.

Because durability is one of the requirements for the basic material of these modern, attractive partitions, J&L high-quality sheet steel enjoys a growing acceptance among manufacturers of movable interior partitions.

J&L success in meeting their demands is the result of rigid quality control during production, coupled with a thorough understanding of product end use.

If you fabricate sheet steel, this formula for successful service can be applied to your requirements. Whatever your specifications for uniformity in workability, formability and drawing properties, you can depend on J&L sheet steel. It will help you get the best out of your production equipment and add to the value of your finished product.

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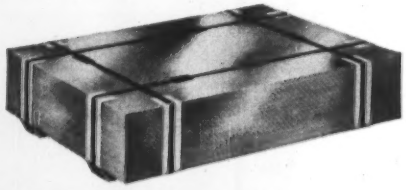

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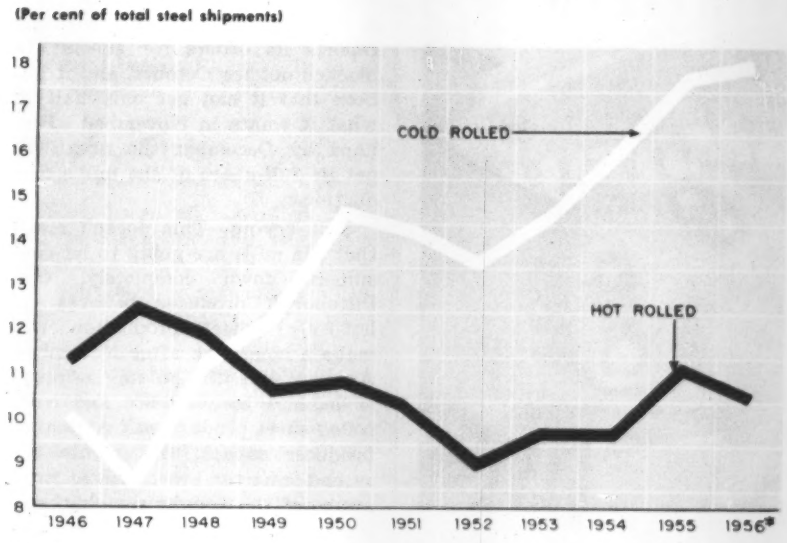
J&L STEEL

Cold-Rolled Vs. Hot-Rolled Sheet THE GAP WIDENS



*First five months.
Source: American Iron & Steel Institute.

H. R. Sheets: Tight Future

Some of the shortness is blamed on the steel strike. Mills prefer to cold roll sheet because of the better profit margin. No letup is in sight for 1956

"THE STEEL strike has fouled up the availability situation for hot-rolled and cold-rolled carbon steel sheets," reports one spokesman in industry. That feeling, which is echoed from coast to coast, sets the stage for a tight market in both products for the rest of the year, with special problems for hot-rolled sheet users.

Prior to the strike, it looked as though a loosening in demand from the auto industry—biggest user of cold-rolled sheet — might result in better supply of the hot-rolled product. In fact, one large producer admits it took more than the usual number of orders for hot-rolled sheet and strip plate late in the spring just to keep its furnaces and hot mill busy during July and August, when it expected light demand for the cold-rolled product. The plan backfired when the steelworkers went on strike. Now, when it has enough cold-rolled business to keep the mill busy, it still has to make good on those earlier orders.

Problem No. 2—Another problem is that only three or four producers can be counted on to supply the hot-rolled market regularly. Several others jump in and out as conditions change. The main reason for this is that hot-rolled sheets are not as profitable an item as cold rolled. Cold rolled carries a premium price because of the extra operations needed to roll it down from hot-rolled stock and to obtain a better surface finish. Many producers feel that raising the price on the hot-rolled product would ruin what market there is for it.

Still another problem is created by the extreme shortage of plates. Several producers turn their hot mills over to the production of strip mill plate when they have open schedules. While this is not a quality plate, such as fire box or flange plate, it finds a ready market for use in railroad cars and other heavy equipment.

Dual Demand — Producers say that when cold-rolled demand is heavy so is hot rolled. Since all cold-rolled sheet starts as hot-rolled stock, it follows that for every ton of cold rolled there will be a ton less of hot rolled. The pinch in supply of hot-rolled sheets becomes greater as demand for cold-rolled sheet increases. This pinch is being felt most by makers of light tanks, drums, conveyor equipment, heating equipment, freight cars, dump bodies for trucks and other products where finish is not the prime requisite.

The auto industry is the key to the whole situation. For that reason, supplies will be tight as motordom gets set for another big year. A typical fourdoor sedan uses 1652 lb of cold-rolled sheet and 964 lb of hot rolled.

Full House—One large eastern mill is opening its books for the fourth quarter and will be unable

Prices: How C. R. Carbon Steel Sheet Keeps Ahead of H. R. Carbon Steel Sheet

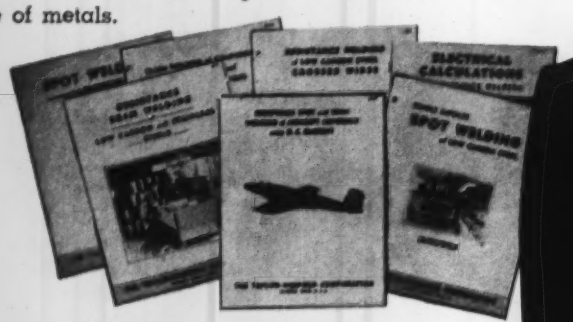
	Gap widens when measured by base prices (Per net ton)	But the difference is smaller when base prices and extras are considered (Per net ton)
August, 1956	$21.50	$18.88*
June, 1956	20.00	17.38*
June, 1955	18.00	19.88*

*Derived from computations by the U. S. Bureau of Labor Statistics.

BEHIND THE MAN FROM TAYLOR-WINFIELD

WELDING TECHNIQUES

T-W recommended practices for basic types of resistance welding on a wide range of metals.



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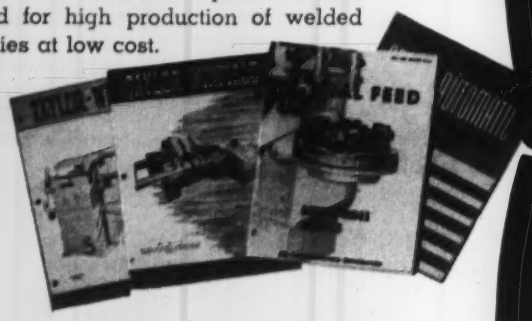
Field-proven standard and special welders designed for high production of welded assemblies at low cost.



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Special experiments in T-W Laboratory determine best welding technique, production equipment and practical design for your product.

LABORATORY REPORTS

The TAYLOR-WINFIELD Corporation
WARREN, OHIO

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OAKVILLE AND WINDSOR, ONTARIO

to accept new tonnage for delivery before the middle of November. Another says it will have not more than six weeks of production to apply to new business this year. A west coast sales organization reports its orders for sheets are blocked out for October, and it has been told it can get only half of what it wants in November. Perhaps by December the area will get its full share of the mill's production.

Still Trying—This doesn't mean that the mills are going to let consumers down completely. One Pittsburgh producer believes its hot-rolled sheet production will make a comeback after November. Another says it is holding a "proper balance between hot and cold-rolled sheet production." A smaller producer says: "Going into the second quarter, we became well aware of the freight car shortage, so we pushed up our hot-rolled production and sales to take care of that market. We increased production at some expense to other products. We will continue on that basis, which represents an increase in hot-rolled production over the first quarter, but we can't raise hot-rolled any more."

Makes Plastic Coated Sheet

Your automobile of the future may have a body which is completely coated with plastic. That's the possibility opened up by the development of a cold-reduced sheet at U. S. Steel Corp., Pittsburgh, which combines the structural strength of steel with the decorative effects of vinyl plastic.

The new product, which is in pilot production at the Irvin Works, Dravosburg, Pa., will be applicable to such products as refrigerators, radio and TV cabinets, wall panels, automotive bodies and trim, stove and heater parts, railroad coach, club and sleeping car interiors, office and home furniture. The sheet can be severely drawn and formed without damage to the coating. The plastic has excellent abrasion resistance and good electrical resistance properties, U. S. Steel officials report.

A special adhesive is applied to the top surface of the base metal and cured. After cooling, the thermoresponsive vinyl plastic is

applied, and the sheet is again heated. Prior to cooling, the coating is embossed to obtain the desired design and texture.

The semicommercial product is being offered for sale on a developmental basis. Range: 18 to 28 gage sheets in 24 to 52 in. widths.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 134 & 135

Many users of hot-rolled sheet will be disappointed if they have not placed orders for fourth quarter deliveries, comments a Pittsburgh sales manager of a large producer.

Some producers are holding back on their order acceptances until they gage the strength of the auto market's demand for cold-finished sheet. Fabricators can place orders for it to be delivered in December if they are regular customers.

Demand for galvanized and electrocoated sheet is slow in New England; fourth quarter tonnage has not been taken.

The installation of a new line for production of vitrenamel sheets and other special sheet products is under way at the Irvin Works, U. S. Steel Corp., Dravosburg, Pa. The mill is scheduled to be completed this year.

Steel Bars . . .

Bar Prices, Page 133

Cold-finished bar production neared normal volume in the Pittsburgh area as Columbia Steel & Shafting Co., Carnegie, Pa., recovered from flood damages.

Bar fabricators say hot-rolled bar shipments are lower than in the first half of this year. Some mills are rolling increased tonnages of reinforcing bars on lines which produced hot-rolled bars early this year. Increased reinforcing bar production is necessary because roadbuilders were hit by shortages during the steel strike. They need more bars in time to complete projects planned for this year.

Need for hot-rolled bars is not as strong as in 1955, because auto makers appear to be well stocked as they begin production of 1957 models.

In some districts, cold-finished

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Up-to-the-minute conveyor planning between automatic machines and control points is essential to gain the full benefits of automation. Your needs in conveyors — ranging from engineered systems of power and gravity types to single units — can be met by Standard. Nearly 50 years of "package" conveyor application experience is available to you. Our engineers can choose from roller, belt, slat, chain, wheel, push-bar conveyors, spiral chutes and pneumatic tube systems, plus special portable types.

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PNEUMATIC TUBE SYSTEMS

bar demand is slow. In New England, for instance, some producers characterize this product as a "drug on the market." Although converters have large inventories, hot-rolled stock is in limited supply.

Stainless bar buying is in slightly larger volume. Automotive demand by forge shops is held to initial 1957 model requirements; a bulge in demand is expected from this quarter within a few weeks.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 133

Construction will start soon on the first section of the Illinois East-West toll road. Public Constructors Inc., Camden, N. J., is apparent low bidder on the 4.7-mile section of four-lane highway northeast of Rockford, Ill. Indicating interest in the 193-mile, $145-million project is the fact that 18 bids were submitted for the initial letting. The contract will call for completion of work within 440 calendar days. It involves grading, drainage, paving and construction of five overpass bridges of precast concrete. The state will advertise for bids on 50 more sections soon.

Copper-Clad Strip Revision

Superior Steel Corp., Carnegie, Pa., revised its base prices on copper-clad, cold-rolled strip, effective Aug. 16. Here are the new levels: 10 per cent, two sides, $41.40 per 100 lb; one side, $33.60 per 100 lb. These prices cover phosphorous deoxidized copper clad, red brass (85 per cent copper, 15 per cent zinc) and gilding metal (90 per cent copper, 10 per cent zinc).

U. S. Steel: New Projects

Laurin D. Woodworth, general superintendent of U. S. Steel Corp.'s Youngstown plants, announces that as part of an expansion and modernization program, the corporation will rebuild a trestle and stockhouse serving its six blast furnaces. American Bridge Division will handle the job. It will require about 4500 tons of structural steel. Other projects include an ore sintering plant and a new ingot plant.

Plates . . .

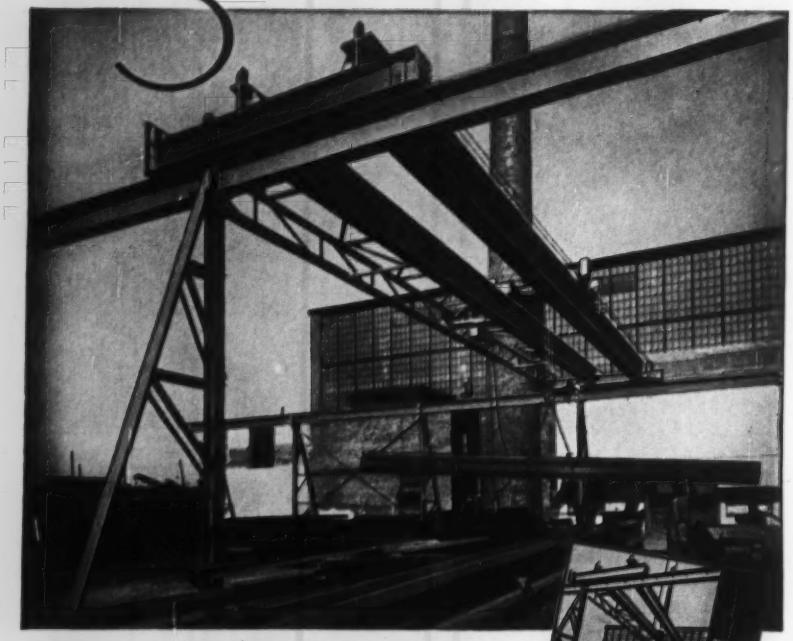
Plate Prices, Page 133

The squeeze continues, although most mills are back to prestrike volume. New requirements seem heavier than ever: Shipwork is mounting steadily, and there's a spurt in line pipe. Work for the government which has to be finished by the end of September is making it particularly tough for the average commercial buyer.

The fall outlook is brightened a bit by the decision to defer suspension of operations at the Sparrows Point, Md., plate mill until year's end. Originally, it was scheduled to go down in mid-September.

In Pittsburgh, heavy plate shipments are six to seven weeks behind schedule. The situation is less severe in light plate. Mills are shipping tonnage promised for delivery in late June.

3 reasons why...



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● *You save on production cost* because time and material savings of modern manufacturing techniques are passed along to you.

● *You gain long term efficiency*, because CRANEMASTER is soundly designed and carefully built for maximum performance, minimum maintenance.

CAPACITIES to 15 TONS—SPANS to 60 FT.

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Describes in detail the many design and operating advantages of CRANEMASTER overhead traveling Cranes. Also explains how Abell-Howe provides competent service from original survey to final installation.

ABELL-HOWE COMPANY 7747 Van Buren Street • Forest Park, Illinois

September shipments of Boston plate fabricators will be light; only a slight increase in tonnage will come before November. Military allotments are heavier.

Standard Oil Co. of California will build a $75-million refinery at Mukilteo, Wash. Operations are scheduled to begin Jan. 1, 1959, with a daily capacity of 60,000 barrels. A large tonnage of plate will be used, but quantities are not stated.

Bids are in on 2000 tons of plate for two Seattle reservoirs, and 1400 tons for the Wahluke siphon line of the Columbia river basin propect. Sizable tonnages are pending for two Oregon power installations.

Wiremaker Modernizes

Seneca Wire & Mfg. Co., Fostoria, O., has announced a $1-million expansion program to be completed within the next year. Some equipment will be replaced; new machinery will be added. The plant's electrical system will be modernized. More production space will be built.

Wire . . .

Wire Prices, Pages 135 & 136

Buying of merchant wire items in Midwest farming areas is proceeding cautiously. Although farmers are expecting fair crops, many have suffered drouth and hail damage this summer. Warehouse stocks of merchant items, such as fencing, are low.

The greatest problem of wire mills is getting enough semifinished steel. Steelmakers need ingots to build up their own stocks. Even integrated wire mills are having trouble increasing production quickly enough to fill strong September and October demand.

Sales managers expect to solve delayed order and production problems soon. After the initial rush for wire, interest dipped slightly, and there is open space on most mill order books for November and December.

One of the principal producers of wire products on the West Coast is shipping out finished products as soon as they are produced. For many items, there is an order waiting list.

Warehouse . . .

Warehouse Prices, Page 138

Tonnagewise, August was the low point of the year in New York. A pickup is expected this month, with buyers back from vacations and a better flow from the mills. The shortage of plates and structurals is retarding the demand for other products required in manufacturing assemblies.

Boston distributors aren't pressing hard for fourth quarter replacements with the exception of heavy hot-rolled products. Volume is notably down in galvanized sheets and cold-finished bars.

Tin plate and some sizes of hot-rolled bars are in short supply in Pittsburgh. Tin plate producers are working full time to meet the canmakers' needs.

Most fabricators have good stocks of sheet, despite predictions of a sheet shortage in the fourth quarter.

Ziegler Steel Service Corp. has opened a warehouse in North Hol-

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PROMAT assures you TOP performance.

IN ACID ADDITIVES

PROMAT'S acid additives are different from those of their competitors. With PROMAT additives you get *top performance* by depolarization. You get a more uniform etch resulting in a better surface for subsequent coatings such as galvanizing, plating, painting, etc.

The *anti-dusting* effect of depolarized pickling helps in prolonging the life of the rolls in the cold reduction operation. You get a rinse-free, dust-free, fine uniform etch without weight loss.

IN CONVERSION COATINGS

PROMAT offers you better finishes and anti-corrosive properties on zinc, cadmium, galvanizing and aluminum coatings.

IN PLATING SOLUTIONS

PROMAT is the largest supplier of acid zinc plating solutions for cyanide zinc, cadmium, white brass and copper.

IN GALVANIZING

PROMAT offers you *top performance* in galvanizing procedures by proper control from the pickling operation through the rinse and flux operations to the hot zinc kettle.

PROMAT also offers you a new additive for your lime bath for your rod and wire preparation before drawing. This new additive gives you better liming and lubrication to insure die life.

IN RESEARCH

PROMAT has an excellent research staff that will attack and solve your problem for you. Free technical information on any of PROMAT'S fine products are yours for the asking.

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"Steelmaker to the Electrical Industry" is a title we have earned the hard way . . . by the sweat of research and pioneering development. In this modern world of gauges and instruments, of automation, electronics and atomics, the heart of the design is so often some silicon steel, high-permeability alloy, or other special electrical material that we produce. ● When *you* need a steel to do what ordinary steels cannot do—whether electrically or in resisting corrosion, heat, wear or great stress, call on us. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

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lywood, Calif., making Ziegler the only distributor with two warehouses in the Los Angeles metropolitan area.

Dolomite Prices Increase

Dead burned dolomite increased $1 a ton, effective as of Aug. 20, to $16 a ton in bulk carload lots, f.o.b. Bettsville, Gibsonburg, Martin, Millersville, Narlo and Woodville, O.; Billmeyer, Blue Bell, Plymouth Meeting, Williams and York, Pa.; Millville, W. Va. The price advanced a like amount to $15 a ton, f.o.b. Dolling Siding and Bonne Terre, Mo.

The current charge for bagging grain magnesite for shipment from Luning, Nev., is $6 per net ton.

Mine Roof Bolt Prices Rise

Youngstown Sheet & Tube Co., Youngstown, increased its prices, effective Aug. 23, on mine roof bolts and accessories. Percentages increases at point of production, Struthers, O., are: 8.5 per cent on mine roof bolts; 10 per cent on mine roof plate washers; 8.5 per cent on all other accessories except mine roof expansion shells, which remain unchanged.

Molybdenum Prices Advance

Climax Molybdenum Co., New York, increased average prices on molybdenite concentrate and molybdenum products about 7 per cent, effective Aug. 25. Representative price increases per pound of contained molybdenum are: concentrate 8 cents to $1.18; canned oxide, 8 cents to $1.39; ferromolybdenum, other than powder, 14 cents to $1.68.

The company recently negotiated general wage increases at its mines and refineries, and the cost of materials and supplies also increased following the steel settlements, says Arthur H. Bunker, president.

To meet the growing demand for its products in U. S. and foreign markets, the company has been required to undertake the processing of lower grade ores at its Climax, Colo., property. Recently announced expansions to milling facilities are part of a long-range program to open up these lower grade ores to commercial exploitation, the company says.

Pig Iron . . . .

Pig Iron Prices, Page 138

Pig iron production in the Buffalo area is almost at capacity with only one idle blast furnace. Merchant producers report steady improvement in demand for iron since the recent price hike.

Prospects for the fourth quarter are bright for pig iron: Good cast scrap is tight, particularly No. 1 machinery cast.

Iron Ore . . .

Iron Ore Prices, Page 139

About 2.23 million gross tons of iron ore came down the lakes in the week ended Aug. 27, compared with 3 million gross tons in the corresponding week a year ago. Shipments for the season now total 38,012,873 gross tons, about 12.2 million less than had been shipped at the same time last year.

Plans of Woodward Iron Co., Birmingham, to develop its iron ore properties near Wildwood, Ala., have been postponed. Woodward recently bought the Muscoda iron mines from Tennessee Coal & Iron Division, U. S. Steel Corp. Now Wildwood won't be developed for another ten years. A sintering plant will be built following tests of the Muscoda ores.

Tubular Goods . . .

Tubular Goods Prices, Page 137

Producers of oil country tubing and specialty products are enjoying nearly full order books for the fourth quarter. Specialty producers report the third quarter need for mechanical and pressure tubing will be met without difficulty.

Mechanical tubing requirements will be strong in the fourth quarter, as auto makers increase production of automatic transmissions. A large Pittsburgh producer has extended its order backlog from a preferred 60 to 90 days, because of auto orders.

Users of oil country tube have about used up backlogs accumulated before the strike.

Los Angeles producers are concerned that foreign activity may

HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

1 to 10	$2.00 ea.
11 to 50	1.90 ea.
51 to 100	1.80 ea.
101 to 200	1.70 ea.
over 200	1.60 ea.

IMPULSE RUNNER

DURALOY

It's a 7 ton 18-8 Casting designed to handle acidulous water

With our battery of large electric furnaces and our large modern well equipped molding department, castings of this size are quite common in our production schedule.

Yet, if you require it, we can produce castings as light as only a few ounces. In fact, with our shell molding department we can produce in quantity very small pieces of any high alloy analysis desired.

Experience? Well, our work with static high alloy castings goes back to 1922 and with centrifugal castings back to 1931. This long experience is your assurance of a sound casting correctly alloyed.

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approach the serious situation of 1954.

In the first half of 1957, 241 miles of 30-in. natural gas pipeline will be laid from Newhall, Calif., to the Colorado river, near Needles, Calif. The project is for subsidiaries of Pacific Lighting Corp. and will cost $24 million. The pipe will be fabricated by Consolidated Western Steel Division, U. S. Steel Corp., Provo, Utah.

Portland, Oreg., awarded 720 tons of cast iron pipe last week and Yakima, Wash., has opened bids for 70 tons. Renton, Wash., has awarded a 100-ton steel pipe project. The Seattle inventory situation is generally more acute, with little improvement expected for 60 days.

Structural Shapes . . .

Structural Shape Prices, Page 133

With deliveries extended into late 1957 and 1958, Boston structural fabricators are predicting higher prices resulting from the recently increased labor and material costs, followed by even higher prices in the next 12 months.

Most new tonnage coming out for long-term contracts will be caught by this double-barreled cost boost, notably bridges and larger tonnage construction. Shops, short of plain material and falling behind on delivery, are cautious in taking on heavier commitments.

Most New York shape producers will have little more than a month's output to offer against new orders in the fourth quarter. One mill, however, which had booked only a month's rolling in the third quarter (July), has recently accepted tonnage for delivery through October, after absorbing some carry-over on hand at the end of June.

Shape deliveries to Chicago fabricators are slowly improving. Few, if any, fabricators still have operations suspended for lack of material. Seattle fabricators are still facing difficulties; some may further curtail production.

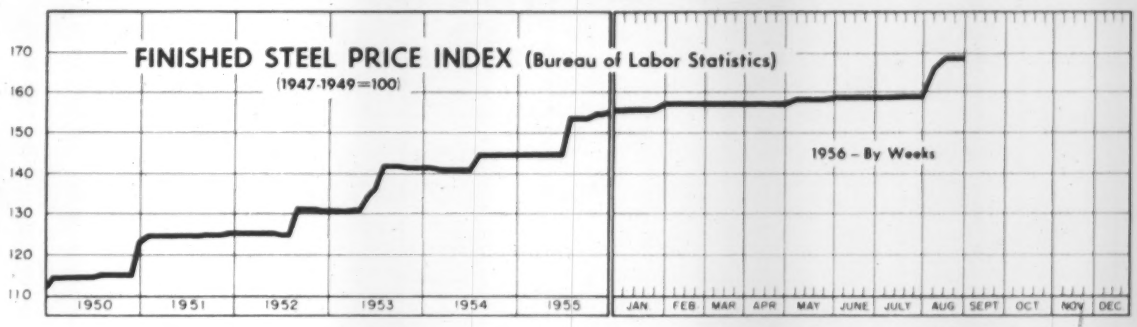
STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7161 tons, Calumet Skyway, section 1-C-2, Chicago, main ramps at Michigan and In-

(*Please turn to page* 142)

Price Indexes and Composites



Aug. 28, 1956	Week Ago	Month Ago	Aug. Avg.	Year Ago
168.6	**168.6**	**158.6**	**168.6**	**153.9**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 28

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
		Tubes, Boiler (100 ft)	45.033
		Tubing, Mechanical, Carbon (100 ft)	22.973
		Tubing, Mechanical, Stainless, 304 (100 ft)	187.133
		Tin Plate, Hot-dipped, 1.25 lb	9.333
		Tin Plate, Electrolytic, 0.25 lb	8.033
		Black Plate, Canmaking Quality	7.133
		Wire, Drawn, Carbon	9.175
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale ties (bundle)	7.213
		Nails, Wire, 8d Common	9.368
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 29 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.71	225.71	210.45	207.63	171.92
Index in cents per lb	6.114	6.114	5.701	5.625	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$137.75	$137.59	$131.27	$127.41	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	61.09	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	60.11	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	61.63	59.77	53.27
Steelmaking Scrap, GT	58.83	58.17	53.17	43.83	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 29 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	4.65	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	4.65	4.65	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.20
Bars, C.F., Pittsburgh	6.85*	6.85*	6.25*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	4.60	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	4.60	4.60	3.65
Shapes, deld. Philadelphia	5.00	5.00	5.00	4.88	3.91
Plates, Pittsburgh	4.85	4.85	4.50	4.50	3.70
Plates, Chicago	4.85	4.85	4.50	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	4.80	4.50	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.50	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.325	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.325	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.325	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.325	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.325-5.425	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	5.85	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.325	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.325	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.25	6.317	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.25-6.35	6.35-6.45	4.90
Strip, C.R., Detroit	6.95	6.95	6.35	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	6.60	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.35	8.35	7.60	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.85	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL

Billets forging, Pitts. (NT)	$91.50	$91.50	$84.50	$84.50	$66.00
Wire rods, ½-⅝" Pitts.	5.80	5.80	5.375	5.025	4.10-4.30

PIG IRON, Gross Ton	Aug. 29 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$62.25	$59.50	$53.00
Basic, Valley	62.50	62.50	60.00	58.50	52.00
Basic, deld. Phila.	66.26	66.26	66.26	59.16	56.49
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	59.66	59.66
No. 2 Fdry, Birm.	59.00	59.00	57.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	62.70	62.70	55.33
Malleable, Valley	63.00	63.00	60.50	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$58.50	$57.50	$55.50	$43.00	$45.00
No. 1 Heavy Melt, E. Pa.	59.00	58.00	54.00	46.50	43.50
No. 1 Heavy Melt, Chicago	59.00	59.00	46.00	42.00	43.50
No. 1 Heavy Melt, Valley	64.50	64.50	59.50	46.50	45.00
No. 1 Heavy Melt, Cleve.	62.00	62.00	56.50	44.00	44.00
No. 1 Heavy Melt, Buffalo	56.50	56.50	44.50	39.50	44.00
Rails, Rerolling, Chicago	84.50	83.50	73.50	64.50	52.50
No. 1 Cast Chicago	53.50	53.50	49.50	46.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.125	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	16.50	16.50	17.50

LOW VOLTAGE CONNECTION DIAGRAM
INDUCTION MOTOR
HIGH VOLTAGE CONNECTION DIAGRAM
SERIAL NO 2242224
TYPE C0GX 215 FRAME
H.P. 5 1750 R.P.M.
VOLTS 220/440 3 PHASE
CYCLES 60 1.15 SERVICE FACTOR
°C RISE 40 CONT DUTY
FRONT BEARING 205KD 307KD SHAFT EXT. BEARING
CODE G B NEMA DESIGN
AMPS. 14/7 C312 OPERATING INSTRUCTIONS
220 - VOLT MOTORS ARE USABLE ON 208 - VOLT NETWORK SYSTEMS
CURRENT AT 208 VOLTS 14.8 AMPS
THE LOUIS ALLIS CO.
MILWAUKEE, WIS. U.S.A.
FRONT BEARING SIZE
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CURRENT OPERATION AT 208 VOLTS
OPERATING INSTRUCTIONS

why is this nameplate important to you?

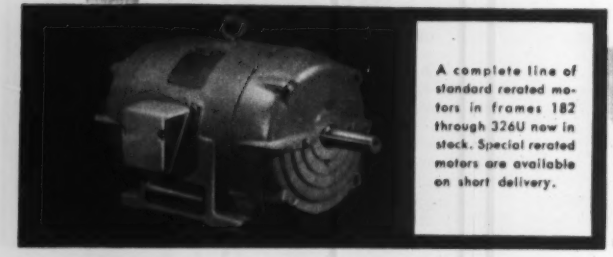
It provides visible evidence that Louis Allis standard motors are built with special care to run better, last longer . . .

Look at the information on this nameplate—information that makes life a lot easier for the user. And to keep this information available at all times, we make this nameplate out of corrosion-resistant stainless steel.

Yes, in the new LA line of standard motors, even the nameplate gets special attention from our engineers. And here's what it means to you:

- The rerated frame size shown means more horsepower from motors with smaller outside dimensions. Performance has been improved by new materials and manufacturing methods.
- Spare bearings can be easily ordered from bearing size and type designations on nameplate, thus eliminating disassembly of motor to determine bearing size. Bearings used are conservatively rated for long life.
- No more lost connection diagram since this information is simply and clearly shown on nameplate. This combined with permanent lead markings, assures that correct motor connections can always be made.
- 220/440 volt motors are suitable for operation on 208 volt systems and full load current for 208 volt operation is included on the nameplate. This eliminates need for original equipment manufacturers to carry a stock of 208 volt motors.

Because they are built with special care, new LA standard motors can do a lot more for you. New bulletin No. 1700 shows you why—just write for your copy.



A complete line of standard rerated motors in frames 182 through 326U now in stock. Special rerated motors are available on short delivery.

LA-106

THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 134; to footnotes, page 136.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston 85 ..... 74.00
Midland,Pa. C18 ..... 74.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $71.00
Bessemer,Pa. U5 ..... 74.00
Bridgeport,Conn. N19 ..... 79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 ..... 74.00
Fontana,Calif. K1 ..... 83.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 ..... 74.00
Lackawanna,N.Y. B2 ..... 74.00
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 74.00
Pittsburgh J5 ..... 74.00
S.Chicago,Ill. R2, U5 ..... 74.00
S.Duquesne,Pa. U5 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $91.50
Bessemer,Pa. U5 ..... 91.50
Bridgeport,Conn. N19 ..... 96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 ..... 96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 ..... 101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston 85 ..... 96.50
Johnstown,Pa. B2 ..... 91.50
Lackawanna,N.Y. B2 ..... 91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 91.50
Munhall,Pa. U5 ..... 91.50
Pittsburgh J5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 ..... 91.50
S.Duquesne,Pa. U5 ..... 91.50
S.SanFrancisco B3 ..... 101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 $107.00
Bridgeport,Conn. N19 ..... 107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 ..... 114.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 128.00
Gary,Ind. U5 ..... 107.00
Houston 85 ..... 112.00
Ind.Harbor,Ind. Y1 ..... 107.00
Johnstown,Pa. B2 ..... 107.00
Lackawanna,N.Y. B2 ..... 107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 ..... 107.00
Midland,Pa. C18 ..... 107.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 ..... 107.00
S.Duquesne,Pa. U5 ..... 107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland R2 ..... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 ..... 111.50
S. Duquesne,Pa. U5 ..... 111.50

SKELP

Aliquippa,Pa. J5 ..... 4.725
LoneStar,Tex. L6 ..... 4.625
Munhall,Pa. U5 ..... 4.625
SparrowsPoint,Md. B2 ..... 4.625
Warren,O. R2 ..... 4.625
Youngstown R2, U5 ..... 4.625

WIRE RODS

AlabamaCity,Ala. R2 ..... 5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.80
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Houston 85 ..... 6.05
IndianaHarbor,Ind. Y1 ..... 5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. 85 ..... 6.05
Kokomo,Ind. C16 ..... 5.90
LosAngeles B3 ..... 6.60
Minnequa,Colo. C10 ..... 6.05
Monessen,Pa. P7 ..... 5.80
N.Tonawanda,N.Y. B11 ..... 5.80
Pittsburg,Calif. C11 ..... 6.45
Portsmouth,O. P12 ..... 5.80
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 ..... 5.90
Sterling,Ill.(1) N15 ..... 6.25
Sterling,Ill. N15 ..... 6.35
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 ..... 6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.30
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala. T2 ..... 5.00
Fontana,Calif. K1 ..... 5.70
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston 85 ..... 5.10
Ind.Harbor,Ind. I-2 ..... 5.00
Johnstown,Pa. B2 ..... 5.05
KansasCity,Mo. 85 ..... 5.10
Lackawanna,N.Y. B2 ..... 5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 ..... 5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 ..... 5.85
Portland,Oreg. O4 ..... 5.80
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14 ..... 5.00
S.SanFrancisco B3 ..... 5.65
Torrance,Calif. C11 ..... 5.70
Weirton,W.Va. W6 ..... 5.00

Wide Flange

Bethlehem,Pa. B2 ..... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 ..... 5.85
IndianaHarbor,Ind. I-2 ..... 5.00
Lackawanna,N.Y. B2 ..... 5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 ..... 5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Clairton,Pa. U5 ..... 6.20
Fontana,Calif. K1 ..... 7.85
Gary,Ind. U5 ..... 6.20
Houston 85 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clairton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 ..... 8.05
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston 85 ..... 7.45
Ind.Harbor,Ind. I-2, Y1 ..... 7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. 85 ..... 7.45
Lackawanna,N.Y. B2 ..... 7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14 ..... 7.35
S.SanFrancisco B3 ..... 8.00
Struthers,O. Y1 ..... 7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Ind.Harbor,Ind. I-2 ..... 7.35
Lackawanna,N.Y. B2 ..... 7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 ..... 4.65
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 5.90
Lackawanna,N.Y. B2 ..... 5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago,Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky. (15) A10 ..... 4.85
Bessemer,Ala. T2 ..... 4.85
Bridgeport,Conn. N19 ..... 4.75
Clairton,Pa. U5 ..... 4.85
Claymont,Del. C22 ..... 5.35
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 ..... 5.25
Conshohocken,Pa. A3 ..... 4.90
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 ..... 5.55
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 ..... 5.05
Harrisburg,Pa. P4 ..... 5.80
Houston 85 ..... 4.95
Ind.Harbor,Ind. I-2, Y1 ..... 4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 ..... 4.85
LoneStar,Tex. L6 ..... 4.85
Minnequa,Colo. C10 ..... 5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. N9 ..... 4.85
Pittsburgh J5 ..... 4.85
Riverdale,Ill. A1 ..... 4.85
Seattle B3 ..... 5.75
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14 ..... 4.85
SparrowsPoint,Md. B2 ..... 4.85
Steubenville,O. W10 ..... 4.85
Warren,O. R2 ..... 4.85
Weirton,W.Va. W6 ..... 4.85
Youngstown R2, U5, Y1 ..... 4.85

PLATES, Carbon Abras. Resist.

Claymont Del. C22 ..... 6.20
Fontana,Calif. K1 ..... 6.70
Geneva,Utah C11 ..... 6.00
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 ..... 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont,Del. C22 ..... 7.55
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 ..... 7.55
Conshohocken,Pa. A3 ..... 7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1 ..... 7.95
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston 85 ..... 7.35
Ind.Harbor,Ind. I-2, Y1 ..... 7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14 ..... 7.25
SparrowsPoint,Md. B2 ..... 7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 ..... 7.25

PLATES, Alloy

Bridgeport,Conn. N19 ..... 6.55
Claymont,Del. C22 ..... 6.85
Coatesville,Pa. L7 ..... 6.85
Fontana,Calif.(30) K1 ..... 7.55
Gary,Ind. U5 ..... 6.85
Houston 85 ..... 6.95
Ind.Harbor,Ind. Y1 ..... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. N9 ..... 6.85
Seattle B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14 ..... 6.85
SparrowsPoint,Md. B2 ..... 6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 ..... 5.925
Harrisburg,Pa. P4 ..... 6.275
Ind.Harbor,Ind. I-2 ..... 5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 ..... 5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10 5.10
Ashland l.c.l. (15) A10 5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..... 5.075
Aliquippa,Pa(9) J5 ..... 5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.575
Bessemer,Ala.(9) T2 ..... 5.075
Birmingham(9) C15 ..... 5.375
Bridgeport,Conn. N19 ..... 5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa. U5 ..... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 ..... 5.175
Emeryville,Calif. J7 ..... 5.85
Fairfield,Ala.(9) T2 ..... 5.075
Fairless,Pa.(9) U5 ..... 5.225
Fontana,Calif.(9) K1 ..... 5.775
Gary,Ind.(9) U5 ..... 5.075
Geneva(9) C11 ..... 5.175
Houston(9) 85 ..... 5.325
Ind.Harbor(9) I-2, Y1 ..... 5.075
Johnstown,Pa.(9) B2 ..... 5.075
Joliet,Ill. P22 ..... 5.575
KansasCity,Mo.(9) 85 ..... 5.325
Lackawanna(9) B2 ..... 5.075
LosAngeles(9) B3 ..... 5.775
Midland,Pa.(9) C18 ..... 5.425
Milton,Pa.(23) M18 ..... 5.425
Minnequa,Colo. C10 ..... 5.525
Niles,Calif. P1 ..... 5.85
N.Tonawanda,N.Y.(9) B11 ..... 5.075
Pittsburg,Calif.(9) C11 ..... 5.775
Pittsburgh(9) J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
Seattle B3, N14 ..... 5.825
S.Ch'c'go(9) R2,U5,W14 ..... 5.075
S.Duquesne,Pa.(9) U5 ..... 5.075
S.SanFran.,Calif.(9) B3 ..... 5.85
Sterling,Ill.(1) N15 ..... 5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Torrance,Calif.(9) C11 ..... 5.775
Weirton,W.Va.(9) W6 ..... 5.075
Youngstown(9) R2, U5 ..... 5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 6.125
Bridgeport,Conn. N19 ..... 6.20
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 ..... 7.175
Gary,Ind. U5 ..... 6.125
Houston 85 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 ..... 6.125
Johnstown,Pa. B2 ..... 6.125
KansasCity,Mo. 85 ..... 6.375
Lackawanna,N.Y. B2 ..... 6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 6.125
S.Chicago R2, U5, W14 ..... 6.125
S.Duquesne,Pa. U5 ..... 6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.425
Bessemer,Ala. T2 ..... 7.425
Bethlehem,Pa. B2 ..... 7.40
Bridgeport,Conn. N19 ..... 7.50
Clairton,Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 ..... 7.425
Fontana,Calif. K1 ..... 8.125
Gary,Ind. U5 ..... 7.425
Houston 85 ..... 7.675
Ind.Harbor,Ind. Y1 ..... 7.425
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. 85 ..... 7.675
Lackawanna,N.Y. B2 ..... 7.40
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Seattle B3 ..... 8.175
S.Chicago U5, W14 ..... 7.425
S.Duquesne,Pa. U5 ..... 7.425
S.SanFrancisco B3 ..... 8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..... 5.225
Lackawanna(9) B2 ..... 5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.075
Atlanta A11 ..... 5.575
Fontana,Calif. K1 ..... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.85
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston 85 ..... 6.45
KansasCity,Mo. 85 ..... 6.45
Youngstown U5 ..... 6.20

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ..... 9.225
Chicago W18 ..... 9.225
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 9.225
Newark,N.J. W18 ..... 9.40
StoringCity,Pa. K3 ..... 8.30
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 6.85
BeaverFalls,Pa. M12,R2 ..... 6.85
Bridgeport,Conn. N19 ..... 7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.85
Chicago W18 ..... 6.85
Cleveland A7, C20 ..... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.25
Donora,Pa. A7 ..... 6.85
Elyria,O. W8 ..... 6.85
FranklinPrk,Ill. N5 ..... 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 ..... 6.85
Hammond,Ind. L2, M13 ..... 6.85
Hartford,Conn. R2 ..... 7.35
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) 830 ..... 7.70
LosAngeles R2 ..... 8.30
Mansfield,Mass. B5 ..... 7.40
Massillon,O. R2, R8 ..... 6.85
Midland,Pa. C18 ..... 6.85
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 ..... 6.85
Pittsburgh J5 ..... 6.85
Plymouth,Mich. P5 ..... 7.10
Putnam,Conn. W18 ..... 7.40
Readville,Mass. C14 ..... 7.40
S.Chicago,Ill. W14 ..... 6.85
SpringCity,Pa. K3 ..... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F3, Y1 ..... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 ..... 6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 8.325
BeaverFalls,Pa. M12,R2 ..... 8.325
Bethlehem,Pa. B2 ..... 8.325
Bridgeport,Conn. N19 ..... 8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 8.325
Chicago W18 ..... 8.325
Cleveland A7, C20 ..... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 7.425
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 8.325
FranklinPark,Ill. N5 ..... 8.325
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 ..... 8.325
Hammond,Ind. L2 M13 ..... 8.325
Hartford,Conn. R2 ..... 8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 ..... 7.425
LosAngeles 830 ..... 9.10
Mansfield,Mass. B5 ..... 8.625
Massillon,O. R2, R8 ..... 8.325
Midland,Pa. C18 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
Plymouth,Mich. P5 ..... 8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 ..... 8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 ..... 8.625
Youngstown F3, Y1 ..... 8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.575
Birmingham C15 ..... 5.375
Bridgeport,Conn. N19 ..... 5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich. G5 ..... 5.475
Emeryville,Calif. J7 ..... 5.85
Fairfield,Ala. T2 ..... 5.075
Fairless,Pa. U5 ..... 5.225
Fontana,Calif. K1 ..... 5.80

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston B5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 .....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. B5 ..5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5.....5.075
Portland,Oreg. 04 .....5.85
SandSprings,Okla. B5..5.575
Seattle B3 N14 .....5.825
S.Chicago R2 .....5.075
S.Duquesne,Pa. U5 ...5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ....5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Kans. B5 ..6.825
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 ....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) F5 .....5.60
Franklin,Pa.(3) F5 .....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 .....5.65
Tonawanda(4) B12 .....6.15
Williamsport,Pa.(3) S19 5.65

BARS, Wrought Iron

Economy,Pa.(B.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(B.R.) L5 ..12.305
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3 .4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4..4.875
IndiaHarbor, Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ...4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....*4.675*
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 ....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ..6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ....4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Dravosburg,Pa. U5 .....5.75
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6.....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ..6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....*5.75*
SparrowsPoint,Md. B2 5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5 ..8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 .8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1.....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
Ind.Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg U5 .....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ...6.90
MartinsFry.O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ....6.30†
Fairfield,Ala. T2 ....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50‡
Ind.Harbor,Ind. I-2 ...6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ...6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ....7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ..9.275
SparrowsPoint(39) B2 9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)8.95
Butler,Pa. A10 (type 2)9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ...6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.175
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G1 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div. Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 NationalTube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. SteelRoll. Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston 85	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity 85	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	*5.95*
Seattle(25) B3	5.675
Seattle N14	5.40
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg U5	7.75
Fontana,Calif. K1	9.65
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Fontana,Calif. K1	8.025
Gary,Ind. U5	6.95
Houston 85	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. 85	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	*6.85*
Boston T6	*7.40*
Buffalo 840	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	*6.95*
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. A7, D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y. (32) R6	6.85
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	8.40
Wallingford,Conn. W2	*7.30*
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	*14.90*
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	*14.55*
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	10.00

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	*8.50*	*10.10*	*12.90*	*15.30*	*18.25*
Boston T6	*8.50*	*10.10*	*12.90*	*15.30*	*18.25*
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.70	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	*8.05*	*9.90*	*12.70*	*15.10*	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	*8.05*	*9.80*	*12.60*	*15.00*	*17.95*
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	7.95	9.80	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	*8.40*	*10.10*	*12.90*	*15.30*	....
New Kensington, Pa. A6	*7.95*	*9.80*	*12.60*	....	....
New York W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y. (32) R6	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford, Conn. W2	*8.40*	*10.10*	*12.90*	*15.30*	*18.15*
Warren, O. T5	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. A7, T6	*8.50*	*10.10*	*12.90*	*15.30*	*18.25*
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)

	Up to 0.80c	0.81-1.05c	1.06-1.35c
Bristol,Conn. W1	16.80	20.65	....
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	*17.15*	*21.00*	*25.35*
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. W12	14.80	....	....
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.50	21.00	25.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	....	....	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	18.80	19.00	19.50	....
Vandergrift,Pa. U5	..	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ¼c lower. **Cut lengths, ¾-cent lower.

STRIP, Galvanized (Continuous)	
Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	*5.25*
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	*6.95**
Warren,O. B9, T5	*6.85**
Worcester,Mass. A7	7.40*
Youngstown C8	*6.85**

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	*5.25*
Sharon,Pa. S3	5.10
Youngstown U5	5.10

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Harbor Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora, Pa. A7	7.20
Duluth,Minn. A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston 85	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. 85	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	*7.20*
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester, Mass. A7	7.50

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth,Minn. A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	*9.025*
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	*8.925*
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	*8.725*
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester J4	8.20
Worcester,Mass. A7, T6	9.025

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth,Minn. A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. 85	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	*8.40*
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	12.65
Buffalo W12	14.15
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	*14.15*
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7,T6	14.45

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	*11.95*
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	*11.75*
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	*11.55*
Muncie,Ind. I-7	*11.75*
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.35
Roebling,N.J. R5	11.85
SparrowsPt. B2	11.65
Struthers,O. Y1	11.35
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	*11.05*
Boston T6	*11.05*
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
Franklin Park,Ill. T6	*10.85*
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	9.80
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester A7, T6	11.05

NAILS, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	.167
Aliquippa,Pa. J5	.167
Atlanta A11	.169
Bartonville,Ill. K4	.169
Chicago,Ill. W13	.167
Cleveland A9	.173
Crawfordsville,Ind. M8	.169
Donora,Pa. A7	.167
Duluth,Minn. A7	.167
Fairfield,Ala. T2	.167
Houston,Tex. S5	.172
Jack'ville,Fla.(20) M8	.178
Johnstown,Pa. B2	.169
Joliet,Ill. A7	.167
KansasCity,Mo. S5	.172
Kokomo,Ind. C16	.169
Minnequa,Colo. C10	.172
Monessen,Pa. P7	.167
Pittsburg,Calif. C11	.186
Rankin,Pa. A7	.167
S.Chicago,Ill. R2	.167
SparrowsPt.,Md. B2	.169
Sterling,Ill.(1) N15	.167
Worcester,Mass. A7	.173
(To Wholesalers; per cwt)	
Galveston,Tex. D7	8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	.167
Aliquippa,Pa. J5	.167
Atlanta A11	.169
Bartonville,Ill. K4	.169
Crawfordsville,Ind. M8	.169
Donora,Pa. A7	.167
Duluth,Minn. A7	.167
Fairfield,Ala. T2	.167
Jack'ville,Fla.(20) M8	.178
Johnstown,Pa. B2	.169
Joliet,Ill. A7	.167
Kokomo,Ind. C16	.169
Minnequa,Colo. C10	.172
Monessen,Pa. P7	.167
Pittsburg,Calif. C11	.186
Rankin,Pa. A7	.167
S.Chicago,Ill. R2	.167
SparrowsPt.,Md. B2	.169
Sterling,Ill.(1) N15	.167
Worcester,Mass. A7	.173

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$10.03
Bartonville,Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	10.03
Duluth,Minn. A7	10.03
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	10.03
Joliet,Ill. A7	10.03
Kokomo,Ind. C16	10.13
LosAngeles B3	10.82
Minnequa,Colo. C10	10.28
Pittsburg,Calif. C11	10.81
S.Chicago,Ill. R2	10.03
S.SanFrancisco C10	10.81
SparrowsPt.,Md. B2	10.13
Sterling,Ill. N15	10.03
Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$10.35
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	10.35
Duluth,Minn. A7	10.35
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	10.35
Joliet,Ill. A7	10.35
Kokomo,Ind. C16	10.45
LosAngeles B3	11.15
Minnequa,Colo. C10	10.60
Pittsburg,Calif. C11	11.15
S.Chicago,Ill. R2	10.35
S.SanFrancisco C10	11.15
SparrowsPt.,Md. B2	10.45
Sterling,Ill. N15	10.35
Coil Interim	
AlabamaCity,Ala. R2	$10.40
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	*10.40*
Duluth,Minn. A7	10.40
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	10.40
Joliet,Ill. A7	10.40
Kokomo,Ind. C16	10.50
LosAngeles B3	11.34
Minnequa,Colo. C10	10.65
Pitts.,Calif. C11	11.20
S.Chicago,Ill. R2	10.40
S.SanFrancisco C10	11.20
SparrowsPt.,Md. B2	10.50
Sterling,Ill. N15	10.40

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.187**
Aliquippa,Pa. J5	.184†
Atlanta A11	.193
Bartonville,Ill. K4	.193
Crawfordsville,Ind. M8	.193
Donora,Pa. A7	.187†
Duluth,Minn. A7	.187†
Fairfield,Ala. T2	.187†
Houston,Tex. S5	.192**
Jacksonville,Fla. M8	.198
Johnstown,Pa. B2	.191*
Joliet,Ill. A7	.187†
KansasCity,Mo. S5	.192**
Kokomo,Ind. C16	.189†
Minnequa,Colo. C10	.192**
Monessen,Pa. P7	.191*
Pittsburg,Calif. C11	.207†
Rankin,Pa. A7	.187†
S.Chicago,Ill. R2	.187**
S.SanFrancisco C10	*207***
SparrowsPoint,Md. B2	.193*
Sterling,Ill.(1) N15	.191*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.181**
Allq'ppa,Pa. 9-14½ga.J5	184†
Atlanta A11	.187
Bartonville,Ill. K4	.187
Crawfordsville,Ind. M8	.187
Donora,Pa. A7	.181†
Duluth,Minn. A7	.181†
Fairfield,Ala. T2	.181†
Houston,Tex. S5	.186**
Jacksonville,Fla. M8	.192
Johnstown,Pa.(43) B2	.185
Joliet,Ill. A7	.181†
KansasCity,Mo. S5	.186**
Kokomo,Ind. C16	.183†
Minnequa,Colo. C10	.186**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	.204†
Rankin,Pa. A7	.181†
S.Chicago,Ill. R2	.181**
Sterling,Ill.(1) N15	.185*

	An'ld	Galv.
WIRE (16 Gage)	**Stone**	**Stone**
Ala.City R2	16.10	17.65**
Bartonville K4	16.10	18.05
Buffalo W12	16.10	....
Cleveland A7	....	16.10
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05*
Kokomo C16	16.20	17.75†
Minnequa C10	16.45	18.15**
P'lm'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	14.85	16.40†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	16.10	17.65
Worcester A7	16.40	....

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala. R2	8.10 8.50**
Aliquippa J5	8.10 8.625†
Atlanta A11	8.20 8.80
Bartonville(48) K4	8.20 8.80
Buffalo W12	8.10 8.50†
Cleveland A7	8.10 ....
Crawfordsville M8	8.20 8.80
Donora,Pa. A7	8.10 8.50†
Duluth,Minn. A7	8.10 8.50†
Fairfield T2	8.10 8.50†
Houston(48) S5	8.35 8.75**
Jacks'ville,Fla. M8	8.45 9.05
Johnstown B2(48)	8.10 8.70*
Joliet,Ill. A7	8.10 8.50†
Kans.City(48) S5	8.35 8.75**
Kokomo C16	8.20 8.60†
LosAngeles B3	9.05 9.65*
Minnequa C10	8.35 8.75**
Monessen P7 (48)	8.10 8.70*
Palmer,Mass. W12	8.40 8.80†
Pitts.,Calif. C11	9.05 9.45†
Portsmouth,O. P12	*8.10*
Rankin,Pa. A7	8.10 8.50†
S.Chicago R2	8.10 8.50**
S.SanFran. C10	9.05 9.45**
SparrwsPt. B2(48)	8.20 8.80*
Str'ling(1)(48) N15	8.10 8.70*
Struth'rs,O.(48) Y1	8.10 8.60‡
Worcester,Mass. A7	8.40 8.80†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	.195
Atlanta A11	.197
Bartonville,Ill. K4	.197
Crawfordsville,Ind. M8	.197
Donora,Pa. A7	.195
Duluth,Minn. A7	.195
Fairfield,Ala. T2	.195
Jacksonville,Fla. M8	.202
Joliet,Ill. A7	.195
Houston S5	.200
KansasCity,Mo. S5	.200
Kokomo,Ind. C16	.197
Minnequa,Colo. C10	.200
Pitts.,Calif. C11	.199
S.Chicago R2	.195
S.SanFran.,Calif. C10	.219
SparrowsPoint,Md. B2	.197
Sterling,Ill.(1) N15	.195

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth,Minn. A7	.167
Franklin,Pa. F5	.167
Huntington,W.Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.157
Minnequa,Colo. C10	.172
Moline,Ill. R2	.172
S.Chicago,Ill. R2	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
⅛ in. and smaller:
6 in. and shorter.... 55
Longer than 6 in.... 46.5
⅛ in. thru 1 in.:
6 in and shorter.... 46.5
Longer than 6 in.... 44
1⅛ in. and larger:
All lengths 44
Undersized Body (rolled thread)
⅛ in. and smaller:
6 in. and shorter.. 55
Carriage, Machine Lag Bolts
Hot Galvanized:
⅛ in. and smaller:
6 in. and shorter .. 35
Longer than 6 in. .. 23
⅛ in thru 1 in.:
6 in. and shorter .. 20
Longer than 6 in. .. 20
1⅛ in. and larger:
All lengths 20
Lag Bolts
All diameters:
6 in. and shorter..... 55
Longer than 6 in..... 47
Plow and Tap Bolts
⅛ in. and smaller by 6 in. and shorter 54
Larger than ⅛ in. or longer than 6 in. 47
Blank Bolts 47
Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 59
Square Nuts, Reg. &
Heavy, Hot Galvanized:
All sizes 45
Hex Nuts, Reg. &
Heavy, Hot Pressed:
¾ in. and smaller.. 63
⅞ in. to 1 in. incl.. 59.5
1⅛ in. to 1½ in., incl. 64
1⅝ in. and larger... 58
Hex Nuts, Reg. &
Heavy, Cold Punched:
¾ in. and smaller.. 63
⅞ in. to 1½ in., incl. 59.5
1⅝ in. and larger.. 58
Hex Nuts, All Types,
Hot Galvanized:
¾ in. and smaller.. 50
⅞ in. to 1 in., incl. 46
1⅛ in. to 1½ in., incl. 51
Hex Nuts, Semifinished, Reg. & Heavy (Incl. slotted):
¾ in. and smaller.. 63
⅞ in. to 1½ in., incl. 59.5
1⅝ in. and larger.. 58

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller... 65
1⅛ in. to 1½ in., incl. 62
1⅝ in. and larger.. 58
(Base discounts, packages, per cent off list, f.o.b. mill)

CAP AND SET SCREWS
Hex Head Cap Screws, Coarse or Fine Thread Bright:
6 in. and shorter:
⅝ in. and smaller.. 47
¾, ⅞ and 1 in., diam. 31
Longer than 6 in.:
⅝ in. and smaller.. 18.5
¾, ⅞ and 1 in. diam. 55
High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 34
¾, ⅞ and 1 in. diam. 13
Longer than 6 in.:
⅝ in. and smaller.. +1
¾, ⅞ and 1 in. diam. ..... +19
Fillister Head, Coarse Thread:
Listed Sizes ..... +31
Flat Head, Coarse Head:
¼ in. and smaller by 6 in. and shorter.. +57
Set Screws, Square Head.
Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter .. 11
Longer than 6 in.... +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
7/8-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2¼	12	42.64	49.94	40.61
2½	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	4.975	5.075	...(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15
TIE PLATES				
Fairfield,Ala. T2	6.025			
Gary,Ind. U5	6.025			
Ind.Harbor,Ind. I-2	6.025			
Lackawanna,N.Y. B2	6.025			
Minnequa,Colo. C10	6.025			
Seattle B3	6.175			
Steelton,Pa. B2	6.025			
Torrance,Calif. C11	6.175			
TRACK BOLTS, Untreated				
Cleveland R2	13.10			
Lebanon,Pa. B2	13.10			
Minnequa,Colo. C10	13.10			
Pittsburgh P14	13.10			
Seattle B3	13.60			
*Treated				
AXLES				
Ind.Harbor,Ind. S13	8.10			
Johnstown,Pa. B2	8.10			
JOINT BARS				
Bessemer,Pa. U5	6.35			
Fairfield,Ala. T2	6.35			
Ind.Harbor,Ind. I-2	6.35			
Joliet,Ill. U5	6.35			
Lackawanna,N.Y. B2	6.35			
Minnequa,Colo. C10	6.35			
Steelton,Pa. B2	6.35			
SCREW SPIKES				
Cleveland R2	12.85			
Pittsburgh P14	12.85			
STANDARD TRACK SPIKES				
Fairfield,Ala. T2	8.775			
Ind.Harbor,Ind. I-2, Y1	8.775			
KansasCity,Mo. S5	8.775			
Lebanon,Pa. B2	8.775			
Minnequa,Colo. C10	8.775			
Pittsburgh J5	8.775			
Seattle B3	9.275			
S.Chicago,Ill. R2	8.775			
Struthers,O. Y1	8.775			
Youngstown R2	8.775			

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅝ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.23c; 1 15/16 to 8 in., inclusive, 6.66c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.50c. for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 2½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1							*0*	*+19.25*	*5*	*+15.25*	*5.5*	*+11.75*	*8*	*+10*
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	*11*	*+19.5*	*1.5*	*+26*	*+7.5*	*+35*	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	*8.5*	*+9*	*9*	*+8.5*	*10.5*	*+7.75*	*10.5*	*+7.75*	*1*	*+17.75*	*1*	*+17.75*
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	....	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	....	34.00	38.50	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.75	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	....	39.75	41.00	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.50	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	....	43.00	41.00	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.75	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.75	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.75	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.75	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.25	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.75	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	....	40.25	38.00	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	....	56.75	42.75	44.75	46.00	67.25	80.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	33.25
304	34.50	41.50	35.25
304-L	37.20	44.65	....
316	38.70	46.65	52.25
316-L	45.70	54.35	....
316-CB	45.90	54.75	....
321	36.35	43.40	42.00
347	39.50	48.45	51.00
405	29.20	37.05	....
410	28.70	36.55	....
430	28.70	36.55	....
Inconel	52.50	68.45	....
Nickel	44.10	58.65	....
Nickel, Low Carbon	46.30	63.15	....
Monel	47.00	62.55	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled—10%	Strip, Carbon Base—Cold Rolled—Both Sides
Copper*	33.60	41.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	....	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill Y1	62.50	63.00	63.00	....
S.Chicago U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee deld.	64.80	65.30	65.30	65.80
Muskegon,Mich. deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
New York, deld	....	69.01	69.51	....
Newark, deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks, deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	64.76	64.76	65.29
Verona,Trafford, deld.	64.79	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O. deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.50%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb piglets, 18% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09§	15.69	8.57	8.12	9.56
Birmingham	7.68‖	8.88‖	8.85‖	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	10.92	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.70	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60[10]	....	7.90	8.00	8.65	8.70[10]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.37
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.95	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	11.20	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.35	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.31	10.43	...	....	8.99	8.74	...	9.90	....	9.02	8.64	11.10

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; 9—400 to 999 lb; 8—2000 to 3999 lb; 10—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmuth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stephens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43. ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$32.50-33.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47% $1.10-1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 3:1	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$35.00-36.00
44% no ratio	25.00-26.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	*$1.18*

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron: Swedish, c.l.f., Camden, N.J., c.l. in bags	8.50
Domestic: F.o.b. Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, iregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb, drum frght, allowed Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.75-51.00†
Bronze, 5000-lb lots	61.25-65.00†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	59.25-62.25†
Phosphor-Copper, 5000-lb lots	67.00
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten: Melting grade, 99% 60 to 200 mesh: 1000 lb and over	Dollars 4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5¼	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.25-14.75
Connellsville, foundry	17.00-18.00

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	*29.50*
Camden, N. J., ovens	28.50
Detroit, ovens	*29.50*
Pontiac, deld.	*31.15*
Saginaw, deld.	*32.71*
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N. J., ovens	28.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	29.50
Neville Island (Pittsburgh), Pa., ovens	28.25
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.05	$7.05	$7.05	$7.45
Bar Size Angles	6.90	6.90	6.90	7.30
Structural Angles	7.45	7.45	7.45	7.85
I-Beams	7.65	7.65	7.65	8.05
Plates	8.90	8.90	8.90	9.30
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.50	26.50	26.50	30.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	7.00	7.00	7.00	7.40
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails	7.80	7.80	7.80	8.10

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $98.50; 19-21% Mn, 1-3% Si, $96; 16-19% Mn, $94.00.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridian, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si. 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D. $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W. $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D. $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.68 in all sizes except powdered which is $1.74; Washington, Pa., furnace, $1.54.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39, f.o.b. Langeloth, Pa.; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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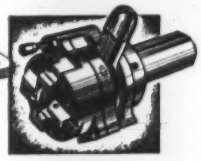

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By Albert Portevin

Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

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(*Concluded from page 130*)

diana avenues, for city of Chicago, to Allied Structural Steel Companies, Chicago.

5370 tons, Calumet Skyway, sections 3-B-2 and 3-B-3, Chicago, for Stony Island traffic interchange, for city of Chicago, to American Bridge Co., Pittsburgh.

4450 tons, Pennsylvania state office building, Philadelphia, through John McShain Inc., general contractor, that city, to Bethlehem Steel Co., Bethlehem, Pa.

1928 tons, Calumet Skyway, section 1-B-1, Chicago, toll bridge between Keefe and State streets, for city of Chicago, to Allied Structural Steel Companies, Chicago.

500 tons, paper mill expansion, Huriburt Paper Co., South Lee, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Gilbane Building Corp., Providence, general contractor.

330 tons, substation steel for Bonneville Power Administration, to Bethlehem Pacific Coast Steel Corp., Seattle; also 15 tons, same project, to Screw Machine Products Inc., Portland, Oreg.

340 tons, state highway bridge, Farmington-Sharon, Me., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Bridge Construction Corp., Augusta, Me., general contractor.

300 tons, addition to Ketchikan Pulp Co. plant, Ketchikan, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Howard S. Wright & Co. Inc., Seattle, general contractor.

200 tons, state highway bridge, Coventry-West Warwick, R. I., to Tower Iron Works, Providence, R. I., through Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor; reinforcing bars to U. S. Steel Supply Division, U. S. Steel Corp., Boston.

290 tons, high school, Orange, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; John Copabianco Co., Boston, general contractor.

200 tons, gymnasium and pool, Hayden Memorial Foundation, Lexington, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; George B. H. Macomber Co., Boston, general contractor.

145 tons, building, General Electric Co., North Haven, Conn., to A. O. Wilson Structural Co., Cambridge, Mass.; contract direct.

107 tons, Washington state undercrossing, Thurston county, to Poole, McGonigle & Dick, Portland, Oreg.; McRae Bros., Seattle, general contractors.

100 tons, hangar, Ft. Richardson, Alaska, air base, to Isaacson Iron Works, Seattle; Chris. Berg Inc., Seattle, general contractor.

STRUCTURAL STEEL PENDING

540 tons, state highway bridge, Jonesport-Beal Island, Me.; Bridge Construction Co., Augusta, Me., low, general contract.

205 tons, state bridge, Adams county, Pennsylvania; bids Sept. 14.

185 tons, state bridge, Lackawanna county, Pennsylvania; bids Sept. 14.

REINFORCING BARS . . .

REINFORCING BARS PLACED

670 tons, 16-story office building and garage, Oklahoma City, Okla., to Robberson Steel Co., through Harmon Construction Co., general contractor, both of Oklahoma City.

224 tons, Washington state highway project, Snohomish county, to Bethlehem Pacific Coast Steel Corp., Seattle; Anderson Bridge Co., Tacoma, Wash., general contractor.

144 tons, two municipal swimming pools, Yakima, Wash., to Soule Steel Co., Portland, Oreg.

88 tons, Edmonds, Wash., high school, to Bethlehem Pacific Coast Steel Corp., Seattle; Dahlgren Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

5800 tons, 3-mile Wahluke siphon, Columbia basin; E-W Construction Co., Eugene, Oreg., low, to Bureau of Reclamation, Ephrata, Wash.

205 tons, state bridge work, Adams county, Pennsylvania; bids Sept. 14.

214 tons, state bridge work, Berks and Lehigh counties, Pennsylvania; bids Sept. 14.

150 tons, Washington state highway bridge, Douglas county; general contract to Curtis Construction Co., Spokane, Wash.

114 tons, state bridge work, Adams county, Pennsylvania; bids Sept. 14.

100 tons, Forest Service bridge, Boise county, Idaho; MacGregor Triangle Construction Co., Boise, low.

100 tons plus, 1-million-gal prestressed concrete reservoir; also pumps and equipment; bids to Coquille, Oreg., Sept. 17.

PLATES . . .

PLATES PLACED

200 tons, water storage tank, Richmond, Wash., to Pittsburgh-Des Moines Steel Co., Seattle.

150 tons, fuel storage, Fairchild Field, Washington state, to Lord-Carroll Co., Portland, Oreg.

PLATES PENDING

2000 tons, two tanks, Bitter Lake project; bids to Seattle, Aug. 29.

1400 tons, Wahluke siphon project, Columbia Basin; bids in to Bureau of Reclamation, Ephrata, Wash.

100 tons, water storage tank, Bremerton, Wash.; bids in.

100 tons plus, penstock for California-Oregon Power Co., Medford, Oreg.; bids in.

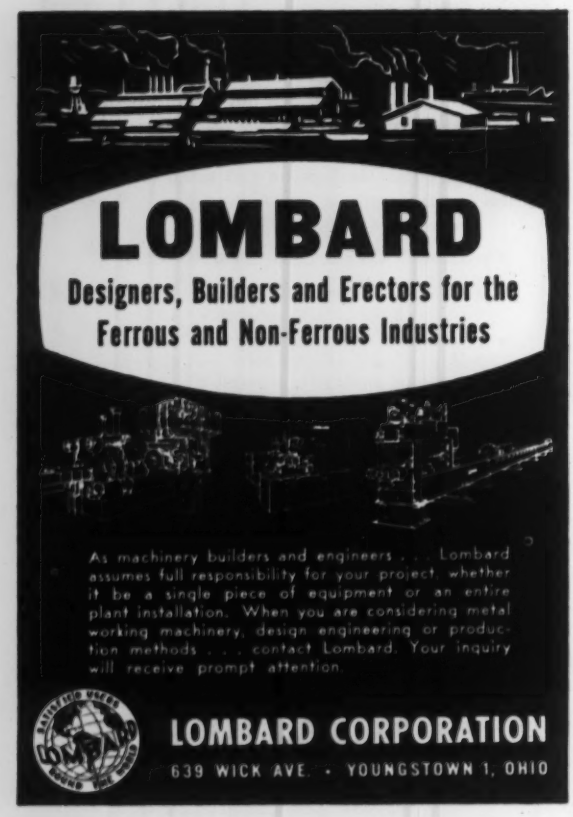
PIPE . . .

CAST IRON PIPE PLACED

500 tons, cast iron pipe, city of Portland, Oreg., to U. S. Pipe & Foundry Co., Seattle, and 200 tons to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

700 tons, various sizes; bids in to Yakima, Wash.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Scrap Price Breaks Record Again

STEEL's price composite on steelmaking grades sets third consecutive record at $58.83. Some consumer resistance is showing up as signs point to a leveling off

Scrap Prices, Page 144

Philadelphia—Steel scrap prices have undergone another advance, although there are some indications of a leveling off as material is coming out more freely. This is true of yard and industrial scrap. Producers of industrial have been holding back a little because of the likelihood of higher prices, and their production is stepping up now that the vacation season generally is over. Collectors of scrap have been more active in view of the uptrend in prices over recent weeks. Demand from consumers continues strong.

Pittsburgh—One of the largest steel producers bought scrap in Pittsburgh last week for mills in this area. It was described as a "small purchase," but was important enough to demonstrate that prices are still climbing. The steelmaker bought No. 1 heavy melting at $59 a ton, $1 above the previous week's market.

Other prices paid were $52 for No. 2 heavy melting and $48 for No. 2 bundles. Those and most other prices on scrap lists show a gain of $2.

Chicago—Despite strong consumer resistance to current prices, the upward trend continues. The feeling is that mills will be unable to place orders at prices applying on their last purchases. To cover on their commitments, brokers are paying $1 to $2 a ton more than mills had paid.

Railroad grades in particular are under pressure, with brokers paying more than steelmakers have offered.

Cast grades are in better demand, with foundries boosting their melting rates.

Seattle—The market is firm here, maintaining the recent $2 a ton increase. Activity is fair, but greater volume is expected later this month. Mills have comfortable inventories. Export demand continues strong as full cargo lots are being dispatched to Japan.

New York—Brokers again have advanced buying prices for open hearth scrap, reflecting continued active demand from both domestic and foreign buyers.

Prime grades of stainless steel scrap are higher with 18-8 sheets, clips and solids at $350 to $360 and 18-8 borings and turnings at $190 to $200. Brokers' buying prices for type 430 sheets, clips and solids are off $5 a ton to $115 to $120. Brokers are paying more for type 410 at $105 to $110.

(*Please turn to page* 150)

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This C-F Coil Lifter, under control of the Crane operator handles hundreds of coils a day in a large mill ... wide, narrow, and of varying tonnage. Fast, infinite adjustments of the motorized legs permit quick pick-up and set-down. Legs can be opened to any width and held ... no need to open to maximum width to handle narrow coil. Maximum of 12" required between coils of any width—saves storage room.

Positive tong grip on coil tightens as lift is made ... insures safe handling. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for Bulletin and complete information.

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 29	$58.83
Aug. 22	58.17
July Avg.	47.70
Aug. 1955	43.97
Aug. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*58.00-59.00*
No. 2 heavy melting	*51.00-52.00*
No. 1 bundles	*58.00-59.00*
No. 2 bundles	*47.00-48.00*
No. 1 busheling	*58.00-59.00*
Machine shop turnings	*38.00-39.00*
Mixed borings, turnings	*38.00-39.00*
Short shovel turnings	*42.00-43.00*
Cast iron borings	*42.00-43.00*
Cut structurals, 3 ft lengths	68.00-69.00
Heavy turnings	*52.00-53.00*
Punchings & plate scrap	68.00-69.00
Electric furnace bundles	68.00-69.00

Cast Iron Grades

No. 1 cupola	*53.00-54.00*
Charging box cast	*50.00-51.00*
Heavy breakable cast	*50.00-51.00*
Unstripped motor blocks	*36.00-37.00*
No. 1 machinery cast	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*67.00-68.00*
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	72.00-73.00
Railroad specialties	74.00-75.00

Stainless Steel Scrap

18-8 bundles & solids	375.00-385.00
18-8 turnings	255.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	61.50-62.50
No. 2 heavy melting	44.00-45.00
No. 1 bundles	61.50-62.50
No. 2 bundles	40.00-41.00
No. 1 busheling	61.50-62.50
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Low phos.	62.50-63.50
Cut structural plates 2 ft and under	67.00-68.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	62.50-63.50

Cast Iron Grades

No. 1 cupola	56.00-57.00
Charging box cast	50.00-51.00
Heavy breakable cast	48.00-49.00
Stove plate	54.00-55.00
Unstripped motor blocks	36.00-37.00
Brake shoes	44.00-45.00
Clean auto cast	56.00-57.00
Burnt cast	43.00-44.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	80.00-81.00
Rails, 18 in. and under	82.00-83.00
Rails, random lengths	75.00-76.00
Cast steel	69.00-70.00
Railroad specialties	74.00-75.00
Uncut tires	73.00-74.00
Angles, splice bars	74.00-75.00
Rails, rerolling	75.00-76.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	64.00-65.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	64.00-65.00
No. 2 bundles	43.00-44.00
No. 1 busheling	64.00-65.00
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	65.00-66.00
Electric furnace bundles	65.00-66.00

Railroad Scrap

No. 1 R.R. heavy melt.	66.00-67.00

CHICAGO

No. 1 heavy melting	58.00-60.00
No. 2 heavy melting	47.00-48.00
No. 1 factory bundles	62.00-63.00
No. 1 dealer bundles	56.00-57.00
No. 2 bundles	43.00-44.00
No. 1 busheling	58.00-60.00
Machine shop turnings	*34.00-35.00*
Mixed borings, turnings	35.00-36.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut structurals, 3 ft	66.00-67.00
Punchings & plate scrap	67.00-68.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	47.00-48.00
Unstripped motor blocks	41.00-42.00
Clean auto cast	57.00-58.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	61.00-62.00
R.R. malleable	71.00-72.00
Rails, 2 ft and under	*81.00-82.00*
Rails, 18 in. and under	*82.00-83.00*
Angles, splice bars	73.00-74.00
Rails, rerolling	83.00-84.00

Stainless Steel Scrap

18-8 bundles & solids	405.00-425.00
18-8 turnings	310.00-325.00
430 bundles & solids	105.00-110.00
430 turnings	52.50-57.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	54.00
No. 2 heavy melting	43.00
No. 1 bundles	54.00
No. 2 bundles	39.00
No. 1 busheling	54.00
Machine shop turnings	29.00
Mixed borings, turnings	32.00
Short shovel turnings	34.00
Punchings & plate scrap	57.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	25.00-26.00
Short shovel turnings	29.00-30.00
Machine shop turnings	29.00-30.00
Bar Crops and plate	55.00-56.00
Structural & plate, 2 ft	54.00-55.00
Electric furnace bundles	51.00-52.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	51.00-52.00
Stove plate	49.00-50.00
Unstripped motor blocks	*43.00-44.00*
Charging box cast	35.00-36.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	50.00-51.00
Rails, 18-in. and under	*67.00-68.00*
Rails, rerolling	71.00-72.00
Rails, random lengths	*63.00-64.00*
Angles, splice bars	*64.00-65.00*

PHILADELPHIA

No. 1 heavy melting	*59.00*
No. 2 heavy melting	*50.00*
No. 1 bundles	*59.00*
No. 2 bundles	*49.00*
No. 1 busheling	*59.00*
Electric furnace bundles	*61.00*
Mixed borings, turnings	*41.00*
Machine shop turnings	*41.00*
Short shovel turnings	*45.00*
Heavy turnings	*54.00*
Structurals & Plates	*62.00-63.00*
Couplers, springs, wheels	*68.00*
Rail crops, 2 ft & under	*71.00-72.00*

Cast Iron Grades

No. 1 cupola	*52.00-55.00*
Malleable	68.00
Heavy breakable cast	*66.00*
Drop broken machinery	*58.00-59.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*52.00-53.00*
No. 2 bundles	*41.00-42.00*
Machine shop turnings	30.00-31.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	35.00-36.00
Low phos. (structural & plate	53.00-54.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	*47.00-48.00*

Stainless Steel

18-8 sheets, clips, solids	*350.00-360.00*
18-8 borings, turnings	*190.00-200.00*
430 sheets, clips, solids	*115.00-120.00*
410 sheets, clips, solids	*105.00-110.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	51.00-51.50
No. 2 heavy melting	*48.50-49.50*
No. 1 bundles	51.00-51.50
No. 2 bundles	*46.50-47.50*
No. 1 busheling	51.00-51.50
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*32.00-33.00*
No. 1 cast	43.00-43.50
Mixed cupola cast	38.50-39.00
No. 1 machinery cast	44.50-45.00

BUFFALO

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	43.00-44.00
No. 1 bundles	56.00-57.00
No. 2 bundles	40.00-41.00
No. 1 busheling	56.00-57.00
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	58.00-59.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	53.00-54.00

Railroad Scrap

Rails, random lengths	58.00-59.00
Rails, 3 ft and under	64.00-65.00
Railroad specialties	57.00-58.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*56.00-57.00*
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*56.00-57.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*56.00-57.00*
Machine shop turnings	*35.50-36.50*
Mixed borings, turnings	*36.00-37.00*
Short shovel turnings	*37.50-38.50*
Cast iron borings	*36.00-37.00*
Low phos., 18 in.	*62.00-63.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	46.00-47.00
Charging box cast	46.00-47.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	*60.00-61.00*
Rails 18 in. and under	*75.00-76.00*
Rails random lengths	*66.00-67.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	42.00
No. 2 heavy melting	40.00
No. 1 bundles	46.00
No. 2 bundles	36.00
No. 1 busheling	46.00
Machine shop turnings	26.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	42.00
Heavy breakable cast	42.00
Unstripped motor blocks	39.00
Brake shoes	49.50
Clean auto cast	50.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	59.00
Rails, 18 in. and under	72.00
Rails, random lengths	70.00
Rails, rerolling	78.00
Angles, splice bars	70.00

SEATTLE

No. 1 heavy melting	46.00
No. 2 heavy melting	42.00
No. 1 bundles	42.00
No. 2 bundles	31.00
Machine shop turnings	25.00-27.00
Mixed borings, turnings	25.00-27.00
Electric furnace No. 1	54.00-56.00

Cast Iron Grades

No. 1 cupola	45.00-47.00
Heavy breakable cast	40.00-42.00
No. 1 wheels	37.00
Unstripped motor blocks	42.00
Stove plate (f.o.b. plant)	33.00-35.00

LOS ANGELES

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	43.00
No. 2 bundles	33.00
Machine shop turnings	25.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00

SAN FRANCISCO

No. 1 heavy melting	46.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 2 bundles	35.00
Machine shop turnings	25.00
Mixed borings, turnings	25.00
Cast iron borings	25.00
Heavy turnings	25.00
Short shovel turnings	28.00
Cut structurals	52.00-54.00

Cast Iron Grades

No. 1 cupola	52.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	43.00
Clean auto cast	52.00
No. 1 wheels	45.00-47.00
Drop broken machinery	52.00

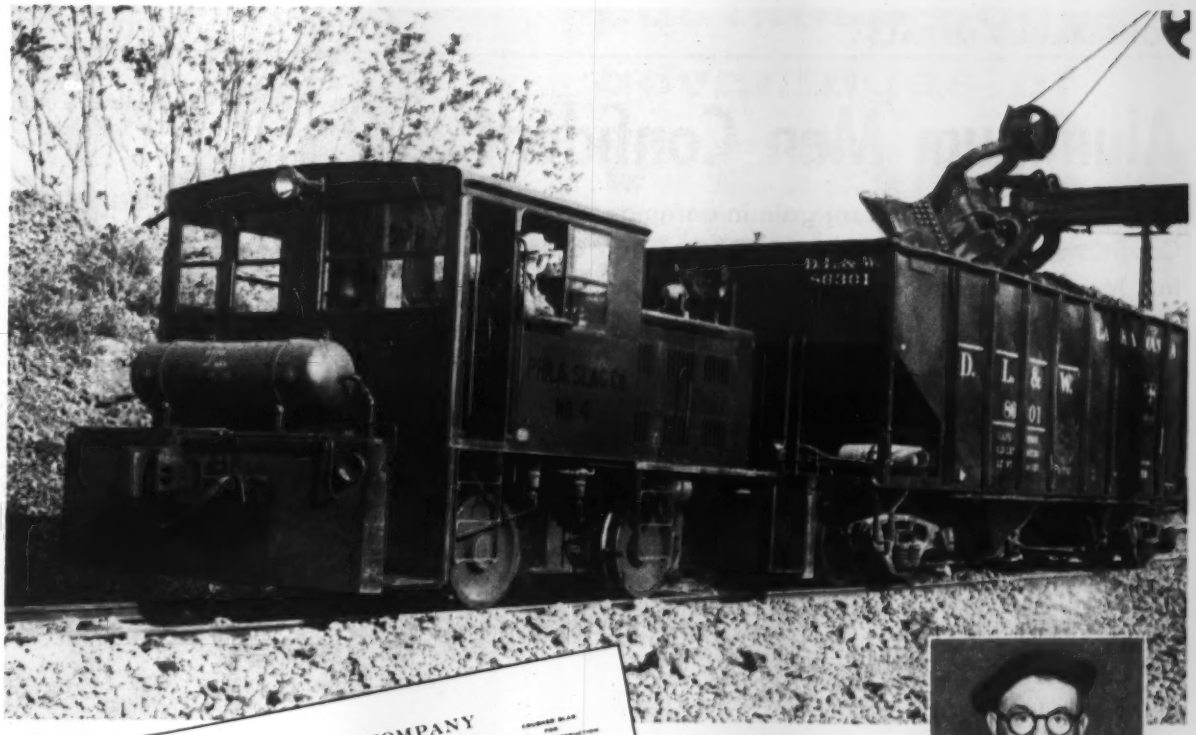
HAMILTON, ONT.

No. 1 heavy melting	49.00
No. 2 heavy melting	44.00
No. 1 bundles	49.00
No. 2 bundles	41.50
Mixed steel scrap	43.00
Busheling, new factory: Prepared	47.00
Unprepared	43.00
Short steel trunings	34.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.



PHILADELPHIA SLAG COMPANY
DIVISION OF ADAMS PRODUCTS CORPORATION
Producers of CONCRETE
CRUSHED SLAG and BITUMI
SWEDELAND, Montgomery Co.

June 28, 1956.

"Paid for itself in two years operation"

Plymouth Locomotive Works
Fate-Root-Heath Company
Plymouth, Ohio

Gentlemen:

In February of 1954, we put into service a 35-ton Plymouth Diesel Hydraulic Locomotive, to haul battleship cars of slag from the slag bank to our plant. This locomotive replaced a 70-ton six wheel steam locomotive.

The Plymouth Diesel has done our work most satisfactorily and at a great saving in the cost of operation. The steamer required 3 to 5 tons of coal per day, while the Plymouth Diesel, doing the same work as the steamer, consumes approximately 75 gals of fuel per week.

The savings effected by the use of the Diesel to date, have equalled the cost of the new locomotive. We are very well pleased that we made the change from steam to Plymouth Diesel.

Yours very truly,
Robert F. Peters
Robert F. Peters, Supt.

Plymouth Torqomotive half as big as former locomotive

Hauls same loads but saves over $1000 in fuel monthly

Pays for itself in 28 months

PLYMOUTH TORQOMOTIVES

Maybe a Plymouth can do the same for *you*. Find out. Send a brief outline of your haulage needs for recommendation. Address: Plymouth Locomotive Works, The Fate-Root-Heath Company, Dept. AI, Plymouth, Ohio.

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

Aluminum Men Confident

Kaiser reports a 52 per cent gain in earnings for fiscal year. Copper and zinc sales spurt as automotive orders trickle in. Most nonferrous observers look for strong fourth quarter

Nonferrous Metal Prices, Pages 148 & 149

PRIMARY aluminum producers beamed with confidence (backed by an expansion announcement) last week. Secondary aluminum smelters sent up a wail for curtailment of scrap exports.

Reporting on Kaiser Aluminum & Chemical Corp.'s fiscal year ended May 31, 1956, Henry J. Kaiser, chairman and president, pointed proudly to a 52 per cent increase in earnings ($43.3 million vs. $28.6 million) over year-ago totals. Mr. Kaiser predicts: "Aluminum usage in the U. S. continues showing the rapid growth that has characterized this industry for several years. This trend will continue, and by 1956, America will be using more than 4 million tons of aluminum a year."

Expansion: Aluminum Co. of America announced that it will begin construction of a seventh potline at its Point Comfort, Tex., Works this month. This will add 20,000 tons to the facility's annual capacity of 120,000 tons. It will boost Alcoa's planned capacity to 962,500 tons a year.

The Aluminum Smelters Industry Advisory Committee recommends that the government should permit no aluminum scrap to be exported during the fourth quarter. Smelters have been trying unsuccessfully to reduce the scrap export quota from 4000 to 1500 tons each quarter. Some aluminum observers feel that smelters may have at least a fighting chance to see their request become a reality. Reasons: 1. The shortage of aluminum scrap is getting no better. There are some indications it may get worse. 2. Foundries are big users of aluminum scrap, and most of them fall into the small business category. In this political year, Washington is becoming unusually sensitive to the problems of this group.

Zinc Sales Spurt

A zinc salesman reports: "We are getting a few orders from diecasters labeled 'immediate shipment' or 'rush.' It may be that some have played their inventory cards a bit too tight to the vest."

It may take three to four more weeks for automotive orders to boost diecasters demands for high grade zinc. However, August sales built up to respectable levels and September should be even stronger. The flurry so far has been from diecasters who have run out of inventories. Most have been buying only the minimum required by annual contracts with the primary producers. With inventories at low ebb, it could mean a near record fourth quarter for zinc.

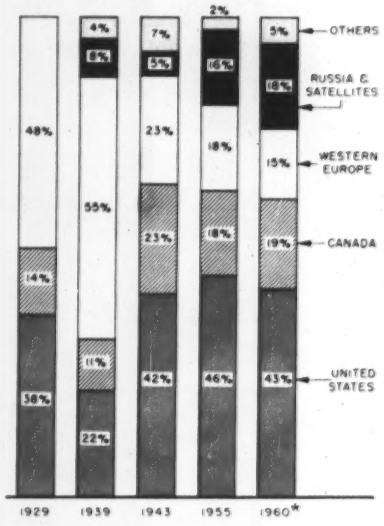
Copper Market Brightens

Copper sales will rack up a solid fourth quarter. One primary producer says: "It looks as though brass mill orders will go from the famine to feast stage."

While there is a tendency to believe that copper supply and demand are once again in balance, producers are quick to point out that they are refusing to sell to many foreign companies. Says one large seller to domestic and foreign interests. "If we had any copper left to sell, we could export thousands of tons."

World Aluminum Production

Selected Years, Per Cent of Total



*Estimated.
Source: Reynolds Metals Co.

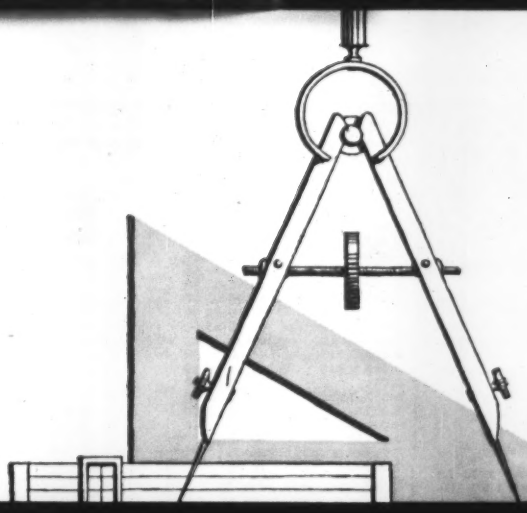
Market Memos

- Dow Chemical Co. explains that effective Oct. 1, 1956, all its magnesium alloys will be designated by the system established by the American Society for Testing Materials.
- Aluminium Ltd. reports that its water problems are over. The Lake St. John Reservoir is filled to capacity, which should insure peak operations until the spring.

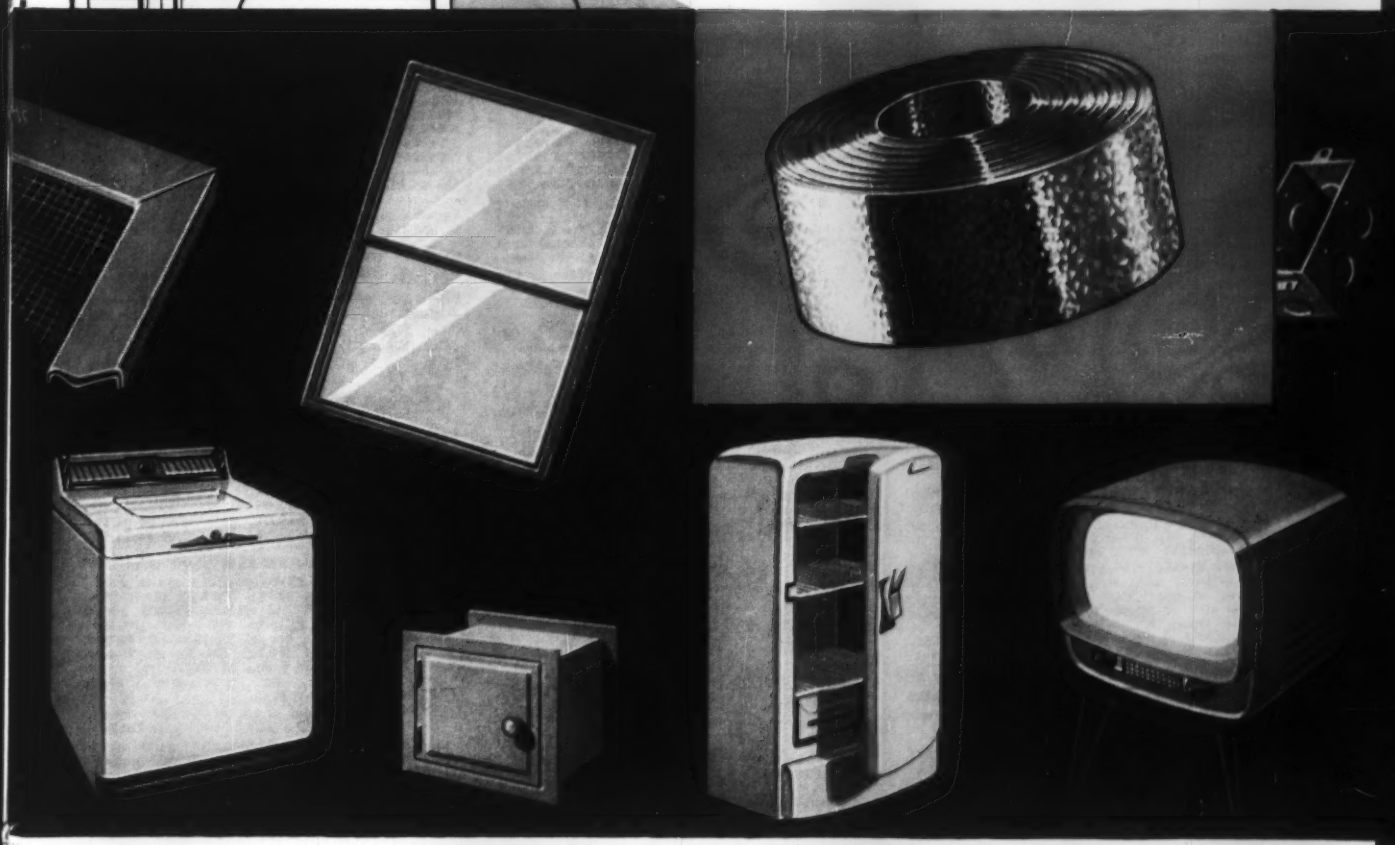
NONFERROUS PRICE RECORD

	Aug. 8 Price	Last Change		Previous Price	July Avg.	June Avg.	Aug. 1955 Avg.
Copper	39.00-40.00	Aug.	22, 1956	39.50-40.00	40.030	43.000	37.759
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	14.800
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	12.500
Tin	99.50	Aug.	27, 1956	99.625	96.435	94.611	96.519
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug.	10, 1956	25.90	25.900	25.900	24.267
Magnesium	35.25	Aug.	13, 1956	33.75	33.750	33.750	30.574

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.



put these bonus advantages of WEIRKOTE galvanized steel to work for you!



For appliances, for other steel products . . . when the job calls for galvanized steel, Weirkote does that job *better.*

Weirkote is made by a special continuous galvanizing process . . . and a tight zinc coating is applied. Result: Weirkote is resistant to peeling, cracking and flaking, even under the severest stresses of fabrication. The coating stays uniform, flows evenly with the base metal, and holds fast under the deepest draws. Amazingly corrosion-resistant, too!

These are just a few of Weirkote's *bonuses* in durability, economy, customer satisfaction. Make it a point to investigate Weirkote from Weirton! Remember: *In the long run, galvanized steel . . . in the LONGER run, WEIRKOTE.*

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. Reading, Pa., or Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 39.00 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 +%, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b., Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 99.50; prompt, 99.25.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10.00 per lb; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-30.75; No. 12 foundry alloy (No. 2 grade), 26.50-27.00; 5% silicon alloy, 0.60 Cu max, 28.25-28.50; 13 alloy, 0.60 Cu max, 28.25-28.50; 195 alloy, 28.75-29.00; 108 alloy, 27.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 27.00, grade 2, 26.25; grade 3, 25.50; grade 4, 25.00.

Brass Ingot: Red brass, No. 115, 37.55; tin bronze, No. 225, 48.00; No. 245, 43.50; high-leaded tin bronze, No. 305, 41.00; No. 1 yellow No. 405, 29.75; manganese bronze, No. 421, 33.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 45.35¢; l.c.l., 45.98. Weatherproof, 30,000-lb lots, 43.78; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.68; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	54.20
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

ALUMINUM (continued)

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Tread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.00-16.50; old sheets, 13.00-13.50; borings and turnings, 9.00-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	SCRAP ALLOWANCES f Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.86c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.10	42.65d	52.64	55.01	27.250	27.000	25.125
Low Brass, 80%	55.85	55.79	56.39	58.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.64	33.125	32.875	32.375
Manganese Bronze	59.46	53.56	63.80	....	25.250	25.000	24.500
Muntz Bronze	53.84	49.65	....	....	25.625	25.375	24.875
Naval Brass	55.72	50.03	62.78	58.88	25.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.26e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.09g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

9.50; crankcases, 13.00-13.50; industrial castings, 13.00-13.50.

Copper and Brass: No. 1 heavy copper and wire, 31.00-31.50; No. 2 heavy copper and wire, 28.50-29.50; light copper, 26.50-27.00; No. 1 composition red brass, 25.50-26.00; No. 1 composition turnings, 24.00-24.50; yellow brass turnings, 15.00-15.50; new brass clippings, 22.00-22.50; light brass, 15.00-15.50; heavy yellow brass, 17.00-17.50; new brass rod ends, 19.50-20.50; auto radiators, unsweated, 19.00-19.50; cocks and faucets, 19.00-19.50; brass pipe, 20.50-21.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-13.50.

Monel: Clippings, 75.00-90.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 75.00-90.00.

Nickel: Sheets and clips, 120.00-195.00; rolled anodes, 120.00-195.00; turnings, 100.00-165.00; rod ends, 120.00-199.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 21.00; 3003 clippings, 20.75-21.00; 6151 clippings, 20.75-21.00; 5052 clippings, 20.75-21.00; 2014 clippings, 20.00-20.25; 2017 clippings, 20.00-20.25; 2024 clippings 20.00-20.25; mixed clippings, 19.25-20.00; old sheets, 17.75-18.50, old cast, 17.75-18.50; clean old cable (free of steel), 19.50-21.00; borings and turnings, 17.25-19.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 35.00; No. 2 heavy copper and wire, 32.00; light copper, 29.75; refinery brass (60% copper) per dry copper content, 31.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 35.00; No. 2 heavy copper and wire, 32.00; light copper, 29.75; No. 1 composition borings, 29.00; No. 1 composition solids, 29.50; heavy yellow brass solids, 20.00; yellow brass turnings, 19.00; radiators, 22.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval, 57.54, 5000-10,000 lb; electrodeposited, 50.28; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. Prices eastern delivery.

Tin: Bar or slab; less than 200 lb, $1.185; 200-499 lb, $1.170; 500-999 lb, $1.165; 1000 lb or more, $1.160.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50; prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35; prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 71.40; 100-600 lb, 62.90; 700-1900 lb, 60.40; 2000-9900 lb, 58.70; 10,000 lb or more, 57.50.

Stannous Chloride (anhydrous): Less than 25 lb, $1.683; 25 lb, $1.333; 100 lb, $1.183; 400 lb, $1.159; 5200-19,600 lb, $1.037; 20,000 lb or more, 91.50.

Stannous Sulphate: Less than 50 lb, $1.31; 50 lb, $1.01; 100-1900 lb, 99.00; 2000 lb or more, 97.00.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

CASH
FOR USED TRANSFORMERS

Convert your used transformers to cash! Send us a description of them TODAY.
TRANSFORMERS AND COILS BUILT TO YOUR SPECIFICATIONS.
Send blueprints for prompt quotation.
TRANSFORMERS BOUGHT, SOLD AND REPAIRED
40 Years of Dependable Service

THE ELECTRIC SERVICE CO.
5329 Hetzel St., Cincinnati 27, Ohio

WANTED
Two OIL-FIRED BOILERS 40,000 and 70,000 lb./hr. 150 PSIG operating pressure.
Give details including weight, date built & photographs.
WRITE: New York Shipbuilding Corporation
Camden, New Jersey
ATTENTION: G. T. Smith

OPPORTUNITIES AND PROFITS

are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

CLASSIFIED

Accounts Wanted

AGGRESSIVE, WELL ESTABLISHED (18 years) Manufacturer's Agency, wishes to represent a dependable volume production stamping company covering Michigan and Northern Indiana. Write Box 464, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

SALESMAN WANTED for a well-established company located in Philadelphia. We are looking for a man with a knowledge of steel, steel products, accustomed to calling on the industrial trade covering an area within a 300 mile radius. Excellent opportunity. All replies will be kept confidential. Write Box No. 465, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

WORKS MANAGER with 20 years in manufacturing. M.I.T. Graduate. Experience embraces production and all allied functions for efficient operation. Write Box 463, STEEL, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 46 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered: present position protected. Ask for particulars. R. W BIXBY, INC., 565 Brisbane Bldg., Buffalo 3, N.Y

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, 50 words or less $15.00, each additional word .30; all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

TWO 35-TON GENERAL ELECTRIC DIESEL ELECTRIC LOCOMOTIVES
Type LSB-404-E50, Standard Gauge 300 HP. Cummins Engines. Now in use. HYacinth 2-7400 Mr. H. Spencer
Over 2500 Machine Tools in Stock
Catalog on request
S&S MACHINERY CO.
140 53rd St., Bklyn 32, N. Y.

MOTORS · GENERATORS
TRANSFORMERS
NEW · REBUILT
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT CO.
PHONE STATION COLLECT GL 4781
P.O. BOX 51 ROCHESTER 1, NEW YORK

HELP WANTED

CONTRACT

MANUFACTURING AGENTS

Nationally known metal fabricating company has million dollar new plant and immediate production capacity. Facilities include eyelet and transfer presses, single and double action draw presses, heading machines, plating facilities, automatic buffing and lacquering equipment, plus broad experience and facilities in assembly. Can produce parts or complete products. We seek agents who now call on volume users. Exceptional financial opportunity. Send complete experience record.

Box #455, STEEL

Penton Bldg. Cleveland 13, Ohio

CAREER OPPORTUNITIES

With one of the most substantial and oldest producers of ferro-alloys for the iron and steel industry.

GENERAL TECHNICAL ASSISTANT — Sound metallurgical education and wide knowledge of metallurgical processes and industries is essential. Experience in some phase of the steel industry is desirable, and research experience would be particularly valuable. Should have a thorough knowledge of library science as the result of specialized education or research experience. Work requires an ability to write fluently and accurately.

TECHNICAL FILE ADMINISTRATOR — Sound metallurgical education is essential. Should have a knowledge of library science through specialized education or research experience. Should have knowledge of a wide range of metallurgical processes and familiarity with the metals industry. Must have the ability to write accurately and fluently.

METALLURGIST OR METALLURGICAL ENGINEER—For field development work on use of alloys in electric steel melting and high temperature alloys. B.S. Degree, several years experience and moderate travel is required.

SALARY: Commensurate with qualifications and past experience.

Please send resume, present salary, and salary requirements to:

Box 461, STEEL
Penton Bldg. Cleveland 13, Ohio

YESTERDAY
TODAY
TOMORROW

CONTINENTAL

Serves Industry Everywhere

COMPLETE PLANTS designed, constructed, and equipped as an integrated unit for efficient and economical production.

CONTINENTAL

Tomorrow's Designs Today

SPECIAL EQUIPMENT industrial furnaces, ovens, gas generators, and dryers—all fuels—field or shop erected.

PRODUCTION LINES tailored to individual needs requiring minimum labor for maximum output.

CONTINENTAL

30 Years' Extensive Experience

insures prompt service in planning and production by experienced engineers who know industry's problems. Our numerous sales and service centers keep in constant touch throughout all phases of the work.

Write for Booklet No. 135

This booklet covers the scope of CONTINENTAL Service. It is well illustrated with views of CONTINENTAL installations with descriptions of the equipment and the processes performed.

5242

CONTINENTAL INDUSTRIAL ENGINEERS, INC.

176 W. Adams Street, Chicago 3, Illinois

DISTRICT REPRESENTATIVES

Ridgewood, N. J. • Indianapolis • St. Louis • Detroit
Cincinnati • Milwaukee • Cleveland • Pittsburgh

(*Continued from page* 143)

Boston — Heavy melting steel scrap for eastern Pennsylvania shipment advanced $2 a ton last week. Brokers also are paying $1.50 to $2 a ton more for No. 2 heavy melting steel and No. 2 bundles. Machine shop turnings are up $1 a ton. For district consumption and export, steel scrap prices are higher than for shipment to eastern Pennsylvania and other distant points, but the differential is narrower.

San Francisco — Steel scrap is strong here, and a price increase is expected momentarily. Ample supplies of cast iron scrap are available on the basis of the present slow business in the foundry trade.

Buffalo — The market here marked time pricewise last week. A firm undertone continued, but consumers are resisting further price advances. The test will come with the placing of new mill orders within a few days. Some observers believe prices will hold around current levels. A few feel that they may edge a bit higher.

There is a noticeable shortage of plant scrap in this district as a result of curtailed production at automotive plants. This has increased the demand for No. 1 material from the dealer trade and has tightened the prime scrap supply.

Dealers believe that higher auto output in the fourth quarter will reduce pressure on the market.

Birmingham—Steel mills in this area have built up inventories to a satisfactory level since the end of the steel strike. They bolstered their position by bringing in substantial tonnages from outside the district because the supply situation area dealers was tight.

Both the electric furnace and cast markets are strong, with some specialty grades advancing in price.

Cincinnati—Keyed to a generally strong undertone, prices are holding steady at last week's levels.

Los Angeles — Price movements are erratic here, but dealers say that posted figures don't reflect the true situation. The market is not expected to become stabilized before mid-September.

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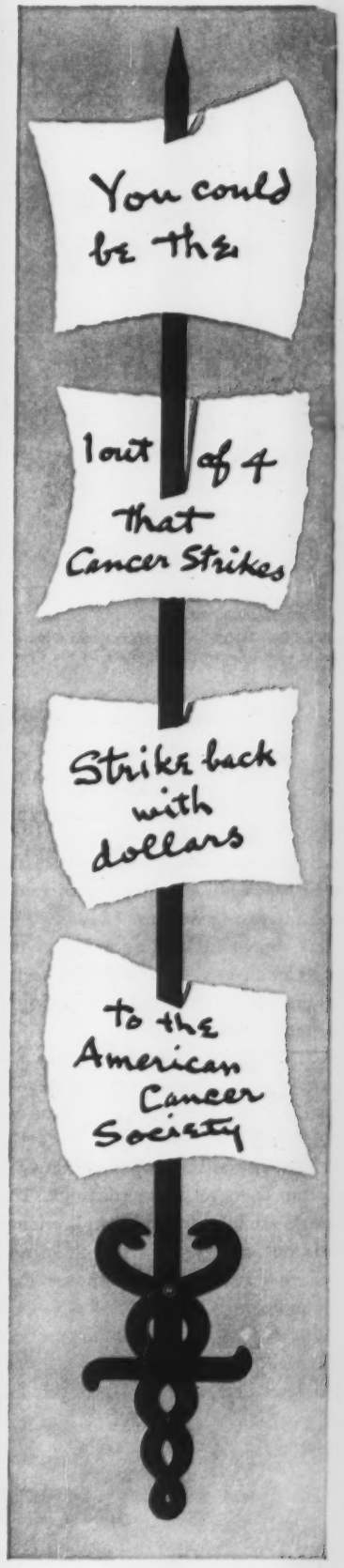
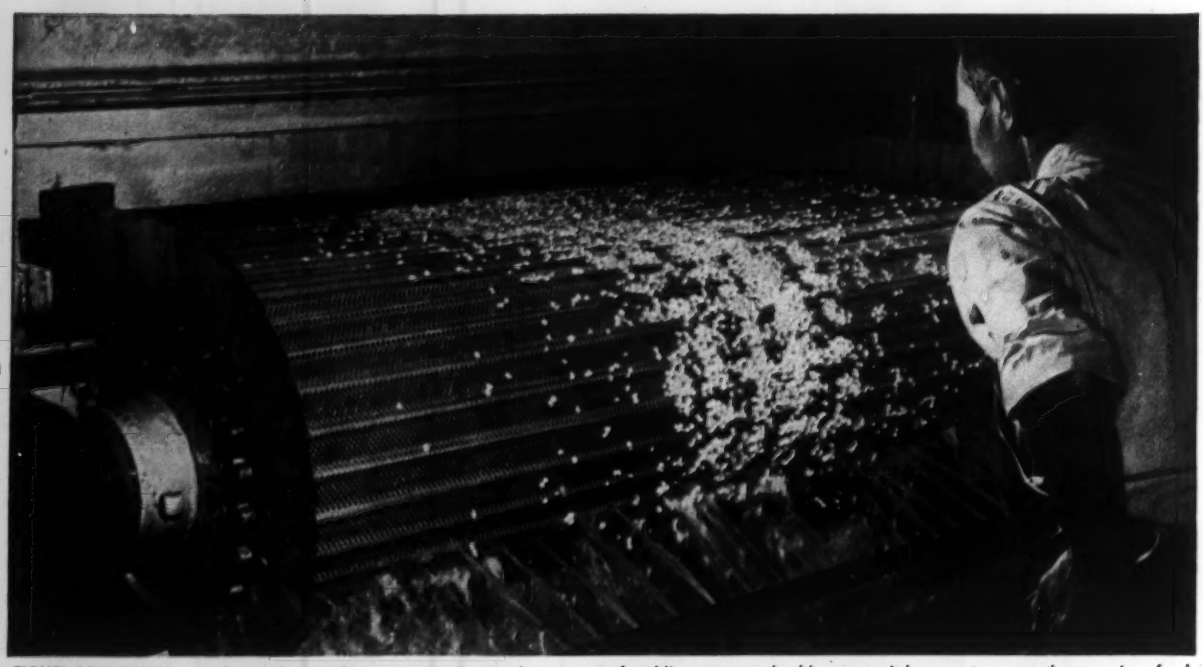




FIGHTS CORROSION — Bethanized wire takes a constant dousing from sprays of scalding steam and cold water as it keeps cut corn on the move in a food-freezing plant. Conveyor belt made by the Cambridge Wire Cloth Co., Cambridge, Md.

No Corrosion Here

Bethanized Wire is armored by pure electrolytic zinc

Need steel wire with plenty of corrosion-resistance? You'll find it hard to beat bethanized wire. We make it with four standard coating weights.

The bethanized coating is locked on, atom by atom, by our unique electrolytic process. Thanks to this tight bond, plus the purity of the zinc, the coating is highly ductile, and can stand severe forming.

You can bend bethanized wire, twist it, wrap it, swage it, weave it—even draw it through dies—and the zinc coating stays on. Some users even roll-thread bethanized wire, cold-head it and weld it.

The bethanized coating is amazingly uniform, too, without any thin spots to invite corrosion. The lighter bethanized coatings are ideal for most applications. But when corrosive conditions are severe or maximum protection is desirable, there are heavier coatings to choose from. And they cost very little more.

Why not let the sparkle of pure zinc add eye-appeal to your wire products? Right now is a good time to find out what bethanized wire can do for you. Our nearest sales office can give you complete details. Or write us for a copy of Folder 615.

TAKES SEVERE FORMING — These are opposite ends of a bicycle spoke made from high-carbon bethanized wire. The hub end is upset and bent. The rim end is roll-threaded. The pure zinc flows during such operations.

STRIPPING TEST VALUES

(determined in accordance with A.S.T.M. Spec. A-90-53)

Ounces of zinc (minimum) per sq ft of bare wire surface

Gage	Type 2 Coating	"A" Coating	"B" Coating	"C" Coating
6	0.70 oz	0.90 oz	1.80 oz	2.70 oz
9	.60	.80	1.60	2.40
12	.50	.80	1.60	2.40
16	.35	.50	1.00	1.50

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Cleveland Worm Gear Speed Reducers were specified and installed on these cage mills by the builders of the equipment—the Raymond Division of Combustion Engineering Co., Inc., Chicago, Ill.

8 CLEVELANDS drive cage mills at L.A. sewage treatment plant

STEADY, continuous operation is all-important here. Each of the 4 double cage mills in the Hyperion Treatment Plant of the Los Angeles Sewage Disposal Division are driven by 2 Cleveland Worm Gear Reducers of 30 HP capacity. Sewage sludge, reduced to 50% moisture, drops into the cage mills with furnace gases at 1300° F. Dried sludge and steam then pass through cyclone separators.

Cleveland Worm Gearing affords exceptional advantages for practically any power job. Steel worm on bronze gear provides the best possible medium to transmit power with minimum friction and wear—reduces motor speed evenly, efficiently, and quietly. Right angle drive makes a worm gear reducer compact and rugged, with few moving parts.

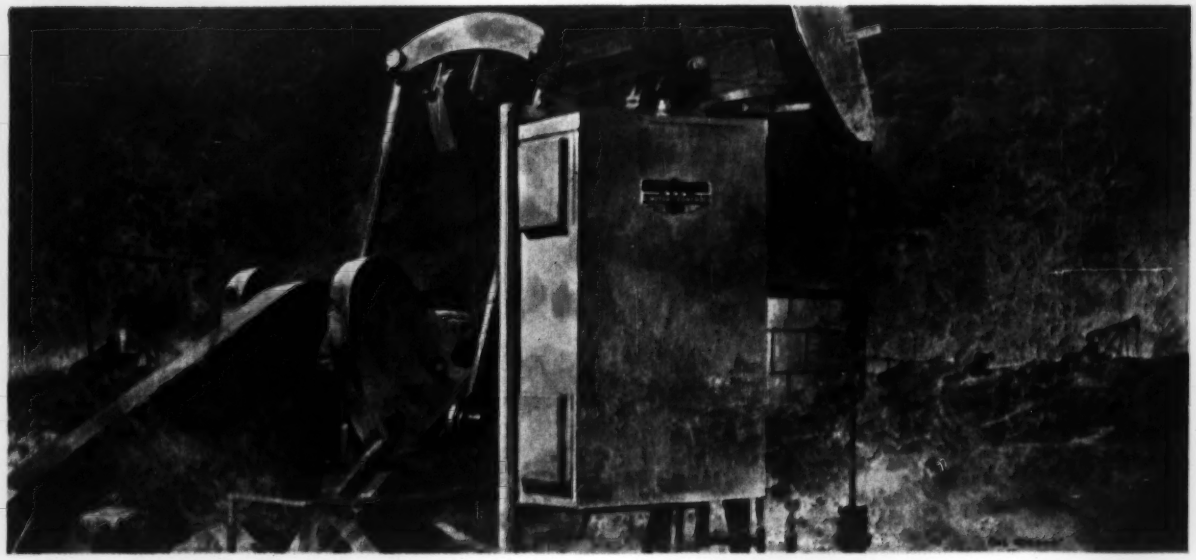
Get the full Cleveland story on power transmission. Write for Catalog 400; ask for technical advice on any problem you may have. The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Drives

WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

New Cutler-Hammer Three-Star Motor Control brings full automation to oil well pumping



If automation means completely automatic operation, oil well pumping has it today. With a remarkable new Cutler-Hammer Three-Star Motor Control unit, oil wells can now be pumped on a pre-set schedule to meet any field allowable . . . completely unattended *indefinitely* as far as the programming or the electrical equipment is concerned. When a power outage occurs, any number of pumps restart in a fixed sequence to prevent overloading the power lines. The control is protected against lightning and the motors are protected against single-phasing which often results from lightning. Blistering heat, ice, bugs or dust hold no terrors for this control designed to thwart them.

The heart of this new control is the Cutler-Hammer Supertimer. It does two things. First, it provides the means for setting the desired pumping schedule (hours per day and days per week). Second, it provides 73 accurately *controlled* restarting intervals (restarting time delays from zero seconds to as much as three minutes) to provide *definite* sequence starting of any number of pumps after any power interruption. Nothing is left to chance; unfortunate coincidental restarting of even two pumps is *impossible*. In addition, a small switch on the panel permits instant conversion from automatic to manual restarting whenever it might be desired. This control has *everything*, particularly the engineered dependability so vital in any automation.

Engineers know this is the way Cutler-Hammer designs and builds motor control. It is evident throughout the new complete line of Cutler-Hammer Three-Star Motor Control. If you are a user of industrial electric motors, it deserves your *immediate* investigation. Its easier installation often affords almost unbelievable savings. Its better performance will save much costly trouble. Its amazingly longer life pyramids its economies. Try it. Compare it. Prove it. Your nearby Cutler-Hammer Authorized Distributor is stocked and ready to serve you. Order from him *now*.

CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

Cutler-Hammer Three-Star Motor Control is available in every needed form

Cutler-Hammer Authorized Distributors carry stocks of Cutler-Hammer Three-Star Motor Control in sizes and types of enclosures to meet all normal industrial control requirements.

Leading machinery builders equip their machines with Cutler-Hammer Three-Star Motor Control as standard original equipment. All components are available for panel mounting.

Cutler-Hammer Three-Star Unitrol provides for easiest and quickest installation or rearrangement of the finest in control equipment. Cutler-Hammer Three-Star Motor Control.

☆ *installs easier*

☆ *works better*

☆ *lasts longer*

CUTLER-HAMMER ☆ ☆ ☆ MOTOR CONTROL C-H